



FRIDAY, SEPT. 20, 1893.

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Contributions.

The Cooke Locomotives for Canada.

Cooke Locomotive & Machine Co.,
PATERNON, N. J., Sept. 22, 1893.

TO THE EDITOR OF THE RAILROAD GAZETTE:

A note in your paper of the 22d inst. says the Dominion Government has placed an order with us for two mogul engines, and that Canadians look upon this as "a direct slap" at the Canadian works. We understood the order was given to us because we could deliver more promptly than the Canadian company. In justice to all concerned we think a statement to this effect should be made.

JOHN S. COOKE,

President.

[We regret that an expression so obviously foolish should have appeared in the columns of the Railroad Gazette. It was carelessness in editing local correspondence.—EDITOR RAILROAD GAZETTE.]

Electric Motors on the Manhattan Elevated.

NEW YORK, Sept. 27, 1893.

TO THE EDITOR OF THE RAILROAD GAZETTE:

In the Railroad Gazette of the 15th inst. there appeared a typographical error in a letter from me, which stated that the "Benjamin Franklin" pulled experi-

mental trains of ten cars upward; it should have read two cars upward. To be more exact the trains varied in weight from 30 tons, two standard coaches, to 84 tons, seven old style coaches.

The evolution of the electric locomotive is rapid, largely through the improvements in the generating station. The average efficiency of the "Ben Franklin" was .15, and in my estimates it was assumed that it might be increased to .30; that was in 1889. To-day the finest examples of electric railroads will return an average of 40 to 60 per cent. of the power generated in the driving engines.

LINCOLN MOSS.

The Use of Mattresses in Bridge Foundations.

In the Railroad Gazette of Feb. 21, 1890, and June 20, 1891, was described the use, by Mr. George S. Morison, of mattresses in sinking the caissons for the foundations of the Memphis bridge. We said then that this ingenious and apparently very efficient application was made for the first time by Mr. Morison and in that work, and we still believe this to be true; at any rate, the statement has never been disputed so far as we have seen. The following description of the method of preparing and using these mattresses and particularly of the saving of the caisson of Pier III. is from the manuscript of the report which Mr. Morison is preparing on that work. The illustrations from photographs were also prepared for the report and show one of the mats for Pier II. in various stages of preparation.

The method adopted to limit the scour was to carpet the bottom of the river with a woven willow mat similar to those which are used by the Mississippi River Commission for the protection of eroding banks. This device proved perfectly successful.

Before the caisson could be placed in position the mats which were to protect the pier sites from scour had to be placed. Two barges were fitted with ways for weaving the mats, and two mooring barges were anchored above the pier site transversely with the stream. The weaving barges were then placed below the mooring barges and the material barges were brought up to the lower side of the weaving barges. The mat was then woven on the ways and the upper end of it fastened to the mooring barges and also to the anchors which held the mooring barges, each anchor carrying two lines, one leading to one of the mooring barges and the other under the mooring barge to the mat. As the weaving proceeded the weaving barges were dropped downstream so that when the mat was entirely completed the weaving barges were at the lower end and the whole mat was floating on the water. The mat woven in this way was 240 ft. wide and 400 ft. long.

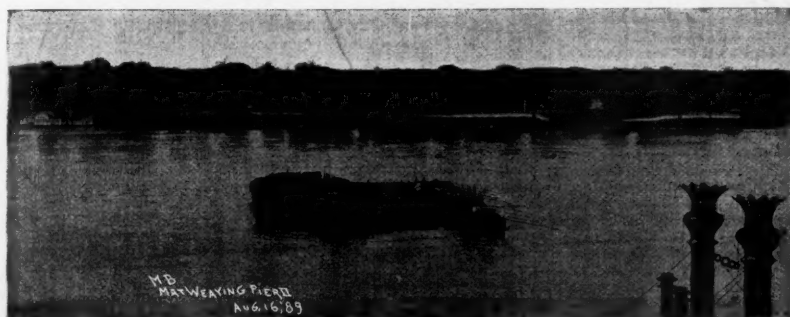
It was loaded with stone until it barely floated and enough stone was thrown on the upper end to sink this end. The upper end of the mat was submerged first and held near the surface by the lines leading from the

mooring barges. Two barges loaded with stone were then floated over the upper end of the mat and stone was thrown from them on the floating mat below. As the mat was sunk the barges were dropped downstream until the entire mat was settled on the bottom. When the sinking barges had passed over about half the length of the mat, the lines connecting the upper end of the mat with the mooring barge were then cast off and the upper end of the mat allowed to sink to the bottom. The whole time required to sink the mat was not over 10 minutes.

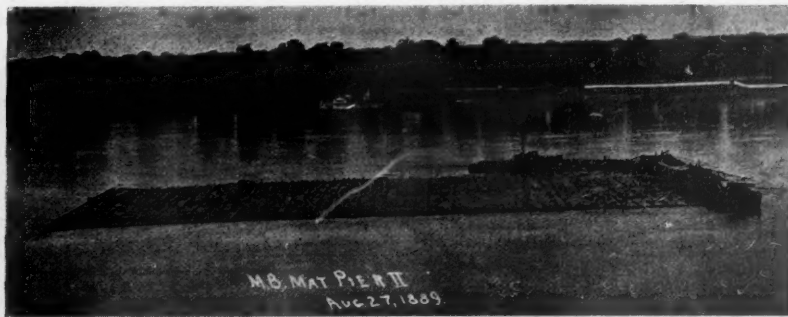
In the case of the first mat sunk, soon after the upper end had been released from the mooring barges the anchors dragged and the mat took a position about 120 ft. farther downstream than was intended. Two mats were placed at the site of Pier II. the first mat being sunk on Aug. 27 and the second on Sept. 10. Each mat contained 1,000 cords of brush and poles, 900 tons of riprap and 10,000 lbs. of wire.

The situation of Pier III. had been considered less exposed than that of Pier II., and one mat only was woven for this pier. The caisson was brought into position without serious trouble on Oct. 28 and the concrete filling begun on Nov. 5. It was none too early; the river had already begun to rise and it continued to rise till the 25th, when it attained a 23-ft. stage. These three weeks formed perhaps the most critical time of the entire work. During this rise the current in this part of the river made an angle of about 10 deg. with the axis of the pier and tended to move the caisson toward the west.* On Nov. 19 the caisson was 20 ft. out of place. Finally by the aid of two tugs and five lines leading to Pier II. the caisson was brought back into a position 5 ft. east of where it belonged. Four days later all the lines leading east and one of the northeastern lines parted and the caisson was carried 50 ft. west of its true position. Five coils of wire rope were ordered and brought down on a passenger train from St. Louis (350 miles) in one night. Additional anchors were put on until the caisson was held by 18 wire ropes leading up stream and five leading eastward. With these lines the caisson was brought into practically correct position and held there until it was finally landed on Dec. 10 at elevation 157, in 44 ft. of water. On the following day the caisson and upper works were completed. It had been necessary to build up the sides of the caisson before putting in the solid timber and to carry it up 4 to 6 ft. above the intended height by false sides. If the water had been 5 ft. deeper it would have been impossible to land this caisson. The caisson had been saved and no loss experienced. Its safety may be ascribed to two things: first, the mat which alone prevented the deepening of the bottom; and second, the strength of the anchorages. The credit for the former is due to the Chief Engineer, Mr. Morison; that for the latter to the Resident Engineer, Mr. Alfred Noble.

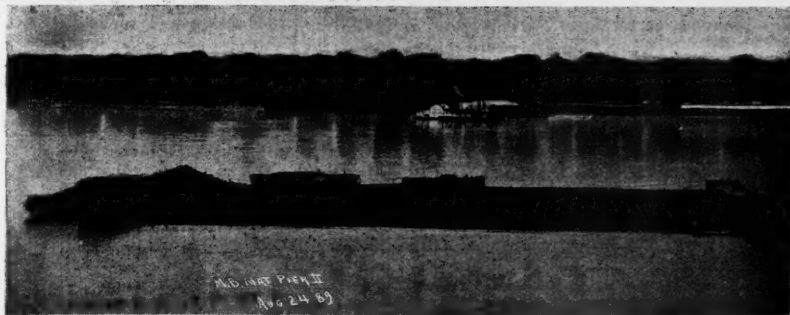
* This caisson was, we believe, 47 x 92 ft.



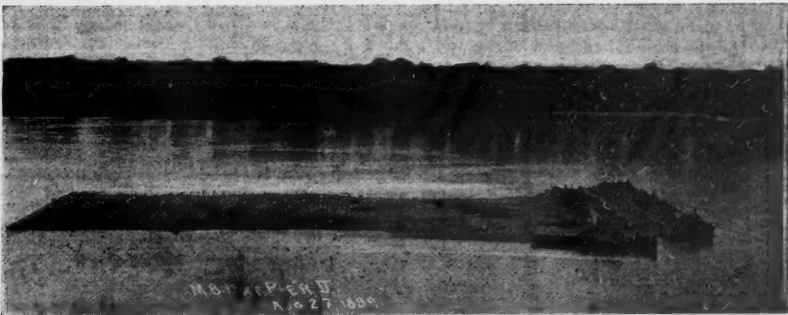
M.B. MAT WEAVING PIER II
Aug 16, 89



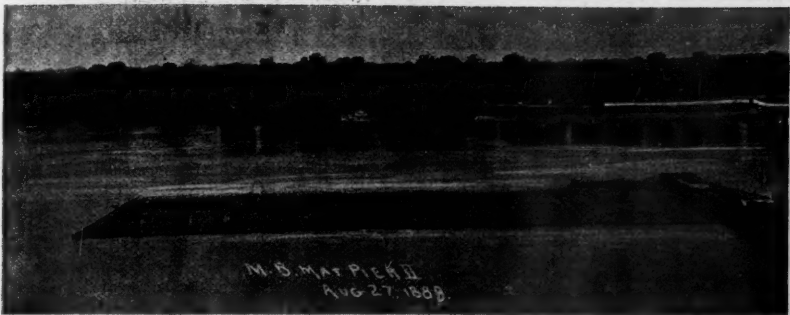
M.B. MAT PIER II
Aug 27, 1889



M.B. MAT PIER II
Aug 24, 89



M.B. MAT PIER II
Aug 27, 1889



M.B. MAT PIER II
Aug 27, 1889



M.B. MAT PIER II
Aug 27, 1889

MATTRESS WEAVING AT MEMPHIS BRIDGE—PIER II.

The Bridge Accident on the Boston & Albany.

The report of the Massachusetts Railroad Commissioners on the Chester accident has appeared. The particulars of this accident were given in the *Railroad Gazette* of Sept. 8, page 663. We give an abstract of the report, repeating some of the facts published in our issue of Sept. 15.

The bridge had been inspected regularly by the bridge inspector of the railroad, and it had been examined by Professor Swain, engineer to the Railroad Commissioners, several times. He had reported that the bridge floor was light for consolidation engines and should be strengthened. This was his only recommendation regarding it and was made in 1891. Recently he had been engaged in a re-examination of the plans of the bridge with a view to deciding whether or not an increase in the strength of the trusses should be recommended, but the President of the railroad company last spring or winter directed the bridge engineer to prepare plans for strengthening not only the floor but the trusses, the design being to bridge up to the standard of the Boston & Albany new bridges. This was not in the way of repairs or of the substitution of new parts for parts worn out, but was wholly a work of strengthening and consisted chiefly in the addition of more plates. The work on the floor system had been finished a month before the accident took place. It was the opinion of Professor Swain that the work done and being done on the bridge would have more than complied with the recommendations of the Commissioners.

All of the bridge work of the Boston & Albany Railroad has been done for some years by Mr. Hawkins, of Springfield, payment being made upon the basis of the labor and material actually consumed in the work. The President of the railroad company stated that his reason for basing the contract price on the cost to the contractor was that there should be no inducement to scant either in material or labor; and it was the President's opinion that Mr. Hawkins was a most careful, competent and painstaking man, who felt an interest and pride in the work done for the company. The superintendent of the bridge company in charge of this work was Mr. J. Dana Reed, who had charge of the work on 18 bridges between Springfield and Pittsfield. It was his duty to see that the work was done and done properly, but he was not expected to supervise personally the actual execution. It appears that during the 3½ days immediately preceding the accident he visited the bridge once, and then only for 10 or 15 minutes to tell the foreman that certain material was about to arrive. The foreman, Daniel Belville, with a gang of 13 men, had charge of the work on the ground.

The Bridge Engineer of the Boston & Albany Railroad explained that it was one of his duties to prepare the plans for bridge work, which, after approval by the Chief Engineer or his assistant and by the President, were sent to the Hawkins Iron Works for execution. Beyond making necessary explanations of the plans from time to time his duty ceased there. It was not his business to supervise work in the field, and he had not visited this bridge at any time since the work on it had begun. Nobody in the bridge department of the road appears to have understood that he had any responsibility whatever with regard to this bridge while it was in the hands of Mr. Hawkins. No official or employee of the railroad company appears to have had more than a casual knowledge of the condition of the bridge at any time while the work was in progress, or to have given any direction in regard to it, or to have had any special charge of the running of trains over the bridge. In a word, there was no supervision of the work on the part of the railroad company.

The examination made by the Board and its engineers showed that, for a length of 25 ft. or more, the cover plates both old and new of the upper chord of the truss, which appears first to have failed, were not fastened to the chord or to each other by either rivets, bolts or drift pins, and that they had in fact slipped off from the chord as the truss was canted over, and were lying elsewhere in the river bed. It was found further that the lateral braces were disconnected from the top chord in both trusses at three or four panel points at the extreme west end of the bridge. The number of empty rivet holes, according to the estimate of Mr. Reed, of the Hawkins Works, was not less than 150. The Board says:

There is not, therefore, a shadow of doubt as to the immediate cause, and (so far as appears) the only physical cause of the collapse of the bridge.

The bridge had thus been radically and fatally weakened. As soon as the head of the train was fairly on the bridge, the west span, beginning at the point in the dismantled truss chord which has been described, began to give way and to fall into the river toward the south.

By the time the engine had crossed the central pier the combination baggage and buffet car next behind had tipped over so far in the same direction as to strike the westerly endpost of the southerly truss of the east span of the bridge with a force sufficient to bend and tear the post out of the end of the truss. This truss then gave way, causing the east span also to collapse and to fall into the river toward the south.

The conductor of the train estimates that it was running at 30 miles an hour, but it is the opinion of the Board that the speed was not less than 35 miles an hour. The conclusions of the Board are as follows:

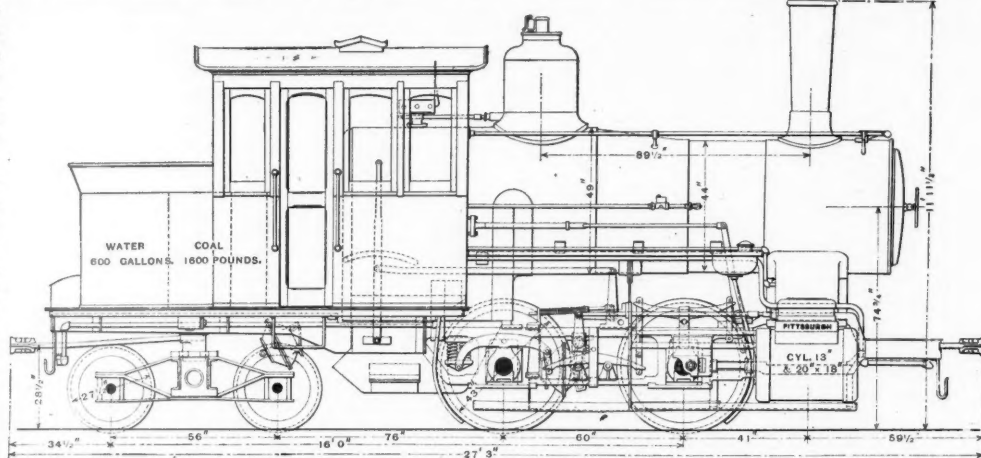
1. That the bridge as originally built was a safe bridge, of sufficient strength for all the traffic which had been

done over it up to the time when the recent work was begun.

2. That the railroad company had made seasonable provision for strengthening the bridge up to the standard required for the heaviest rolling stock now in use on its road; and that the plans . . . were ample for that purpose.

3. That the bridge on the day of the accident, in its normal condition, was of adequate strength.

4. That the collapse of the bridge was caused by the



Compound Locomotive for the Brooklyn Elevated Railroad.

Built by the PITTSBURGH LOCOMOTIVE WORKS, Pittsburgh, Pa.

unnecessary and dangerous weakening of the top chord of the southwesterly truss of the bridge.

5. That the immediate responsibility for the disaster rests upon Daniel Belville, the foreman, who had the charge and direction of the work, and who on this day recklessly allowed the work to be done by improper methods and the bridge to be left in an utterly unsafe condition, and heedlessly neglected to warn the coming train.

6. That no blame attaches to the conductor, engineer or other trainmen of the wrecked train.

7. That the speed of the train was not the cause of nor, properly speaking, a contributing cause to the collapse of the bridge.

8. That the contract made by the President of the railroad company with the proprietor of the R. F. Hawkins Iron Works, under which the work on this and other bridges was done, was designed and adapted to secure the best material and workmanship; that the confidence of President Bliss in Mr. Hawkins as an experienced and competent bridge builder and worker was well grounded, and that Mr. Hawkins desired and intended to do all such work for the company in the best and most satisfactory manner; but that it was not wise or proper for the railroad company to devolve upon Mr. Hawkins and his employees, or to allow him or them to assume or exercise in the execution of work under the contract, any of the duties and responsibilities of its own officers and servants with respect to the security of the bridge and the safety of travel over it.

9. That there was in this case a serious and, as it proved, a fatal neglect or omission on the part of the railroad company to provide a competent supervisor or inspector, employed by and directly responsible to itself, to see that the bridge was at all times during the progress of the work in a safe condition for the passage of trains, and, in case it should be at any time unsafe, to give due warning and to prevent such passage until the bridge had been made safe. If such supervision or inspection had been exercised in the present case the disaster could not have occurred. The original responsibility for the accident must therefore rest with the railroad company.

It is recommended that in all cases similar to the present, where work is to be done on a railroad bridge which involves the temporary removal of essential parts—such as rivets, bolts or members of any kind—or other weakening of the structure, one of the two following precautions be adopted:

First—That a competent inspector, appointed by and responsible directly and solely to the railroad company, be stationed at the bridge, whose duty it shall be to watch the progress of the work and to inspect the condition of the bridge, so that he shall know at all times whether or not the bridge is in a safe condition for the passage of trains, and to signal approaching trains to stop or to reduce speed in case it becomes at any time necessary or prudent to do so. Or—

Second—That the bridge be supported by a temporary trestle sufficient to carry safely all trains while the work is in progress and until its completion.

No general rule can be laid down as to which of these precautions should be taken. Either ought ordinarily to be sufficient. The second has this advantage: that when the bridge is supported on a trestle the work can be done in the manner most convenient and economical for the contractor, without having to guard against the temporary weakening of the structure and without reference to the passage of trains.

The first, as above phrased, supposes that the railroad company would not desire to divide with the contractor the responsibility for the due execution and completion of the work while it is still in progress, but would prefer to make it the duty of the inspector to keep himself advised at all times of the actual condition of the bridge as affecting the safety of trains, rather than to supervise and direct the manner of the execution of the work by the contractor.

The inspector may, of course, properly be charged with both of these duties if the contract so provides or allows.

No additional recommendation is deemed necessary with respect to the speed of trains. In cases where a bridge is in process of building or is undergoing general reconstruction or extensive repairs, the slowing of trains is necessary, and is required in general practice. In cases like the present, however, the slowing of all trains at all times is not necessary, and therefore is not recommended. In the present case, if there had been a sufficient trestle, the train would have passed safely over the bridge. If instead of a trestle there had been a competent inspector, the train would have been stopped.

Compound Locomotive, Brooklyn Elevated Railroad.

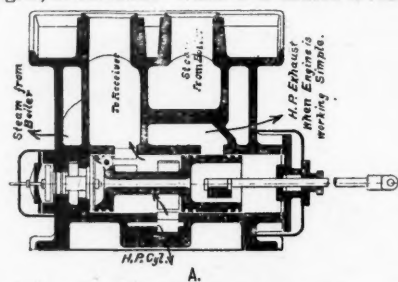
We show a side elevation, with principal dimensions, of a compound locomotive built by the Pittsburgh Locomotive Works for the Brooklyn Elevated Railroad. This is one of a lot of three built under specifications prepared by Mr. O. F. Nichols, General Manager and Chief Engineer of the railroad company, all of which are now

in service. We have shown in a previous issue the compound locomotives built by the Rhode Island Locomotive Works for the same service. It is probably too early to say anything of the comparative efficiency of the two designs. Extracts from the specifications follow:

The locomotives to be of the "Forney" type, having two pairs of coupled wheels and a four-wheeled swing motion on truck.

Gauge.....4 ft. 8½ in.
Fuel.....Anthracite coal
Driving wheel base.....5 ft.
Rigid wheel base.....5 ft.
Total wheel base.....about 16 ft.
Weight in working order.....about 56,500 lbs.
Weight on drivers.....about 40,000 lbs.
Weight on truck.....about 16,000 lbs.
Tank capacity.....600 gals.
Height of rail to top of stack.....12 ft.
Length between centers of link pins.....25 ft. 6 in.
Height of draw bar from top of rail.....2 ft. 4½ in.
Width of "deck".....8 ft. 2 in.
Width of engine, out to out of cylinders, must not exceed width of "deck".
Fire ox.....50 in. x 42½ in. radial stays
Flues.....1½ in. diam.

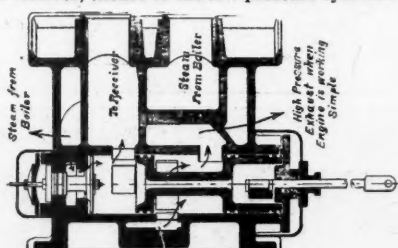
Figs. A and B show the general construction of the starting gear and intercepting valve of the Pittsburgh compound locomotives. This gear is generally placed on the cylinder saddle, and is so arranged that the engineer by moving the lever in the cab can open an independent exhaust for the high-pressure cylinder through the passage fig. A, to the stack. When it is desired to run com-



A.

pound the lever is again moved and the intercepting valve is open. In fig. B the intercepting and reducing valve are shown when in the position to work compound.

In this system steam from the steam pipe in the high-pressure cylinder saddle passes to the reducing valve through a small passage shown in figs. A and B. When the reducing valve is permitted to open, as it is in fig. A, by the removal of the intercepting valve to the right, steam passes directly through the reducing valve, as shown by the arrows from the high-pressure steam pipe to the receiver, thence to the low-pressure cylinder. The



B.

amount of reduction of pressure by the reducing valve depends upon the ratio of the areas of the piston of the reducing valve and the area of the valve itself.

When the engine is to be run compound the engineer forces the intercepting valve back to the position shown in fig. B by means of the rod which is connected to a lever in the cab. The movement of the intercepting valve to the left forces the reducing valve to its seat, as

shown in fig. B, and permits the high-pressure cylinder to exhaust into the receiver. When in the non-compound position, shown in fig. A, the high-pressure cylinder exhausts directly to the atmosphere, as indicated.

Compound Passenger Locomotive for the Chicago, Milwaukee & St. Paul.

The engravings printed herewith show the construction of a compound locomotive built for the Chicago, Milwaukee, & St. Paul by the Rhode Island Locomotive Works and exhibited at the World's Fair. This engine is of the ten-wheel type, although there are 12 wheels in all, the pair of 42-in. trailing wheels being placed under the hind end for the purpose of carrying a part of the weight. The principal dimensions of this engine are as follows:

Length of engine and tender over all.....	63 ft. 1/4 in.
Total wheel base of engine and tender.....	50 ft. 6 3/4 in.
Wheel base of engine.....	29 ft. 9 1/4 in.
Wheel base, driving.....	13 ft. 6 in.
Boiler diameter.....	62 in.
Height of stack above rail.....	15 ft. 1 1/2 in.
Center to center, main connecting rod.....	123 1/2 in.
Driving wheels, diameter.....	78 in.
Engine truck wheels, diameter.....	F. 33 in. R. 42 in.

Diameter of crown stays.....	1 1/4 in.
Diameter of staybolts.....	3/4 and 1 in.
Thickness of piston, high pressure.....	6 in.
Thickness of piston, low pressure.....	5 to 6 in.
Kind of piston packing.....	Cast iron Spring ring
Diameter of piston rod.....	3 1/4 in.
Cylinders.....	21 and 31 x 26 in.
Size of steam ports, high pressure.....	20 x 1 1/2 in.
Size of steam ports, low pressure.....	25 x 1 1/2 in.
Size of exhaust port, high pressure.....	20 x 3 in.
Size of exhaust port, low pressure.....	25 x 3 in.
Valve greatest travel.....	6 1/4 in.
Outside valve lap, high pressure.....	1 in.
Valve clearance, high pressure.....	3/4 in.
Valve lead, high pressure.....	3/4 in.
Valve lead, low pressure.....	3/4 in.
Blast nozzle, kind.....	Variable
Tender, fuel capacity.....	6 tons
Tank capacity.....	4,000 gals.
Weight on drivers.....	90,000 lbs.
Weight on front truck.....	41,000 lbs.
Weight on trailing truck.....	19,000 lbs.
Total weight in working order.....	150,000 lbs.
Weight of tender.....	75,000 lbs.

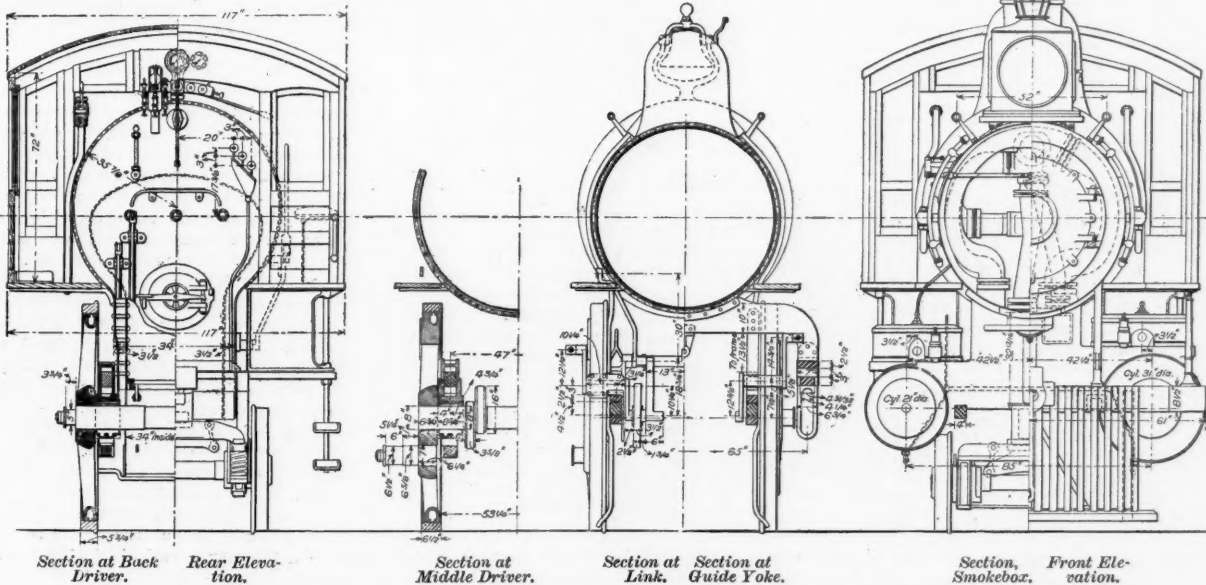
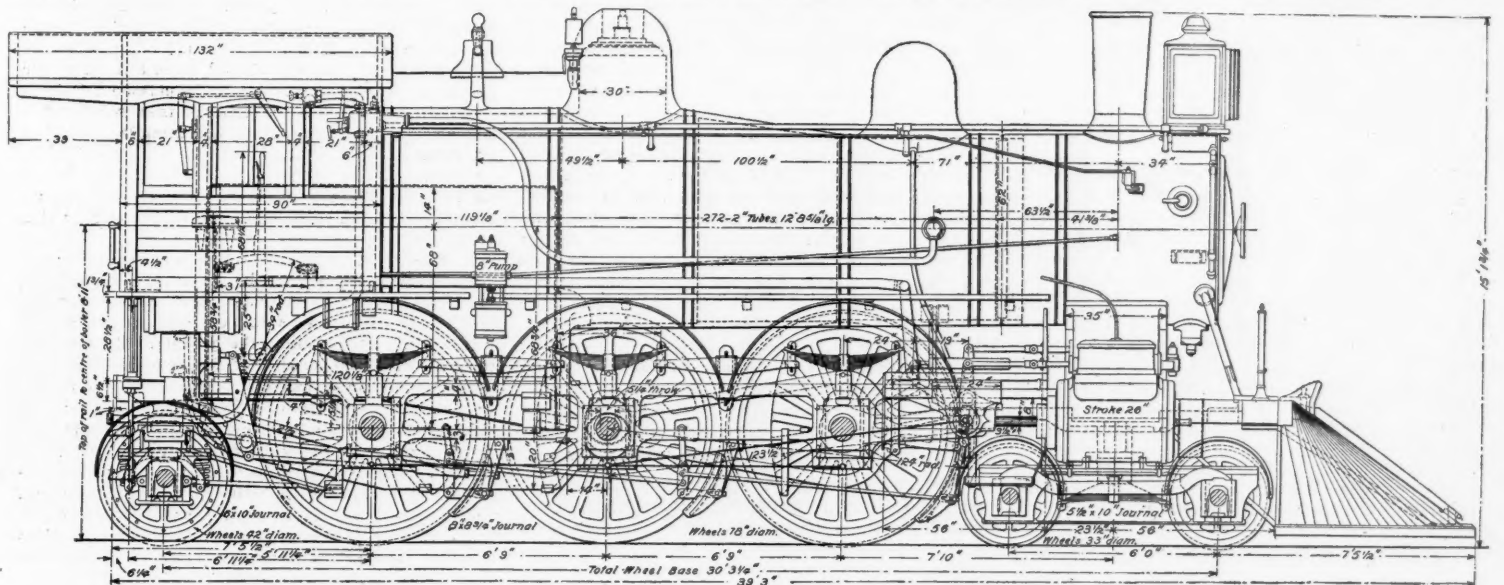
The front truck is built of 1/4-in. steel riveted with 1/2-in. rivets. The small wheels under the engine have steel tires, fastened by retaining rings. The tender has a white oak frame, and it is carried on chilled cast iron

New York Street Railway Association.

The Eleventh Annual Meeting of the Street Railway Association of the State of New York was held in Rochester, N. Y., Sept. 19, 1893. The President, Mr. C. Denmore Wyman, was not able to be present, but wrote a letter in which he said that "the street railroad business has now passed into the regions of science and is calling to its service the best efforts of skilled scientific intelligence." Another year he thinks will show even greater growth than the past one.

In the absence of the President, Mr. D. B. Hasbrouck, of New York, Vice-President, presided, and made a short opening address, chiefly reminiscences of the old methods of transportation in New York City.

The report of the Executive Committee showed that five companies had joined during the year, and the present membership is 28 companies. The Committee was glad to note the rapid development of the overhead system in Broadway (meaning evidently the trolley) and considered it an object lesson in construction, equipment and operation that will be very useful to the country and the world at large. The Committee con-



COMPOUND EXPRESS LOCOMOTIVE, CHICAGO, MILWAUKEE & ST. PAUL RAILROAD.

Built by the RHODE ISLAND LOCOMOTIVE WORKS, Providence, R. I.

Tender truck wheels, diameter.....	33 in.
Driving journal.....	8 x 8 3/4 in.
Size truck axle journal, front.....	5 1/4 x 10 in.
Size truck axle journal, back.....	6 x 10 in.
Tender axle journal.....	4 1/4 x 8 in.
Size main crank pin journals.....	6 1/4 x 6 in.
Size coupling rod journals, front and back.....	5 x 3 1/4 in.
Size coupling rod journals, main.....	6 1/4 x 5 1/4 in.
Type of boiler.....	Extended wag- on top
Material in boiler barrel.....	Steel
Diameter of dome.....	30 in.
Height of dome.....	27 in.
Material of tubes.....	Charcoal iron
Number of tubes.....	272
Crown sheet stayed with radial stays.....	2 in.
Diameter of tube plates.....	12 ft. 8 1/2 in.
Length over tube plates.....	120 1/4 in.
Width of firebox.....	33 1/4 in.
Depth of firebox, front.....	82 1/2 in.
Depth of firebox, back.....	72 1/2 in.
Material of firebox and tube sheets.....	Steel
Heating surface, firebox.....	204 sq. ft.
Heating surface, tubes.....	1,584 sq. ft.
Heating surface, total.....	1,788 sq. ft.
Grate surface.....	27 sq. ft.
Kind of grate.....	Rocking
Thickness of boiler shell.....	5/8 in.
Boiler pressure.....	200 lbs.
Thickness of firebox side sheet.....	3/8 in.
Thickness of back sheets.....	3/8 in.
Thickness of crown sheet.....	3/8 in.
Thickness of tube sheet.....	3/8 in.

wheels. The rear truck has center and side bearings.

A perspective view of this engine was shown in the *Railroad Gazette* of June 9 last.

The locomotive is a two-cylinder compound with large steam ports, and has the Rhode Island starting gear illustrated in the *Railroad Gazette* Sept. 15, 1893. The link motion has the long eccentric rod used on all of the 10-wheelers for the St. Paul road. The driving wheels are unusually large for a 10-wheel engine, being 6 ft. and 2 in. in diameter. The steam ports and passages are large, and apparently should give an opportunity to regulate the distribution of steam in a satisfactory manner at high speed.

The crossheads are the Laird type, and in this differ from previous St. Paul 10-wheelers. The boilers are the wagon top radial stay type, with the firebox down between the frames at the front end and sloping up toward the back end; altogether, the engine has some admirable features in design for fast speed passenger work. It has received much attention from the visitors at the World's Fair. These engines were built under a guaranty of operation, and tests are now being carried out on the St. Paul road.

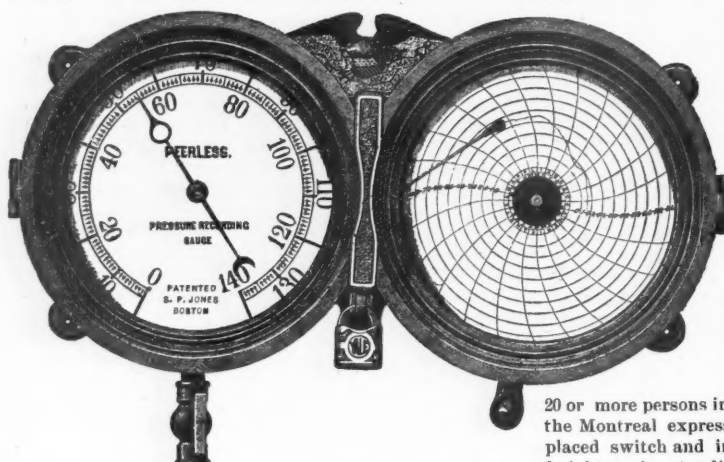
gratulated the Association on the fact that during the last session of the state legislature not a single bill aimed at the operation and conduct of the business had become a law; expressed the opinion that the business situation is improving and closed with a tribute to the memory of Mr. John Stephenson.

A paper had been expected from Mr. George W. McNulty, Chief Engineer of the Broadway cable road, but Mr. McNulty wrote to say that he did not think his road had been in operation long enough, or that the improvements on which he had been requested to write had been sufficiently tested in practice, to justify him in writing the paper this year.

A report was received from Mr. T. J. McTigue on the Return Circuit of Electric Railroads. The sum of his argument is that the rails should be used for the return circuit, and that the "absurd and costly supplementary wire" will soon disappear from practice. On a wet day in moderate weather the earth is available for a return circuit, but this cannot be relied upon in long spells of dry weather, or in severe winter weather, when the ground is deeply frozen and when the greatest efficiency is wanted. He called attention to

the electrolytic decomposition of the rails when the earth is relied upon for the major part of the return circuit. Taking the extreme cases of the conditions on Tremont street, Boston, or Fulton street, Brooklyn, where there may be massed 100 slowly moving cars on a mile of double track, the decompo-

The "Alley" elevated road of Chicago recently made use of one of these instruments in some interesting experiments to determine the number and intensity of brake applications made by the engineers in stopping, the instrument being connected to the brake cylinder of a car. The intensity of the applications was quite clearly shown with the dial geared to rotate once in two hours, but on account of the short interval elapsing between applications it was found necessary to double the speed of rotation to get a clear record of the number of applications.



The "Peerless" Recording Pressure Gauge.

sition of the rails in a year would amount to about 17,000 lbs. of metal. At this rate it would not be many years before "the rails would be qualified for a pension for loss of both feet incurred in the service." While this cannot be entirely avoided it can be reduced to a minimum by giving the track circuit its greatest possible electrical value, and perhaps by dipping the rails before laying. He then took up the question of rail bonds, which he discussed at considerable length, and closed by saying, "I am therefore led to the conclusion that the best return circuit is that which complies with the following requirements:

1. Intrinsic resistance low enough to need no help from earth.
2. Utilization, to the utmost practical extent, of the rails as the return conductors.
3. Rail bonds of the heaviest practicable size.
4. Rail bonds of the shortest possible length, consistent with due allowance for expansion and vibration.
5. Rail bonds made of a single piece of wire with integral rivets.
6. Rail bonds tightly riveted to the rails through holes freshly reamed immediately before bonding.
7. Rail bonds so placed as to permit convenient inspection.
8. Rail bonds protected against corrosion.
9. A very liberal use of heavy cross bonds from rail to rail direct, and, in double track, extra heavy cross bonds connecting the two inside rails.
10. An underground main or trunk return from power house to track, and there connected to each line of rails, and low enough in resistance to carry the maximum current with but a nominal drop in potential.

"Not one of these requirements is an extravagance, but, on the contrary, their proper application to almost any electric railway in the country would be of immediate and lasting benefit. In new constructions they would be a positive economy in first cost. There is not one of them which cannot be adopted in practice, and it seems obvious that their complete embodiment in any existing road would be immediately noticeable in the power-house, and eventually in the dividend."

This paper was discussed briefly by the convention.

The Nominating Committee proposed the following gentlemen for officers for the ensuing year: *President*, D. B. Hasbrouck, New York City; *First Vice-President*, G. Tracy Rogers, Binghamton; *Second Vice-President*, James H. Moffitt, Syracuse; *Secretary and Treasurer*, W. J. Richardson, Brooklyn; *Executive Committee*, John N. Beckley, Rochester; Daniel F. Lewis, Brooklyn; Charles Clemmishaw, Troy.

The Association adjourned to meet in Syracuse the third Tuesday in September, 1894.

The Peerless Recording Pressure Gauge.

The use of devices for automatically recording the pressure on a boiler or battery of boilers has, in the past few years, rapidly extended. Manufacturers and managers of well regulated steam plants have not been slow to recognize the value of an apparatus which apprises them of any unusual irregularity in steam pressure.

One of the most widely used of such devices now in service is the Peerless pressure recording gauge, manufactured by the Crosby Steam Gauge & Valve Company, of Boston. This gauge is simple and practical in construction, and has met the test of several years' service in a satisfactory manner. It consists of a steam gauge of the usual construction, mounted on an iron frame in connection with a clockwork so arranged as to rotate the dial to which is fastened a card on which the record is made. Connected with the indicating mechanism of the gauge itself is a light arm projecting partly across the dial and carrying at its end a reservoir, capable of holding a few drops of ink and a pen which presses lightly upon the paper.

For general use, the dial is geared to revolve once in 24 hours, but it can be arranged to run faster or slower for special service.

20 or more persons injured. The second section of the Montreal express, westward, ran over a misplaced switch and into the head of an eastbound freight train standing on the side track. The passenger train was going at high speed and the wreck was terrible. The passenger engine exploded a moment after the collision throwing fragments of the wreck and bodies of the dead and living long distances. The first section of the passenger train had passed in safety, the engineer of the freight acknowledging, by whistle, that he saw the signal indicating that a second section was to follow; but a brakeman, Hubert Thompson, went and turned the switch to let the freight train out. Details are wanting, but it looks as though he did this when the passenger train was in sight, or at least near by, and that Thompson was overcome with fear so that he did not straighten the switch even when he had time to do so.

The Eastman Automatic Refrigerator Car.

The illustration shows the automatic arrangement used in the Eastman refrigerator cars for maintaining a practically uniform temperature. Referring to the drawing, A is a thermostat attached to the ceiling of the car and connected with the valves B B, which, when open, allow communication of the air between the interior of the car and the ice tank in either end. With the valves open the course of the air currents is, as indicated by the arrows, from the interior of the car through the openings into the ice-tanks, where a large part of the impurities is absorbed by the water drawn through the ice-tanks to the air flues formed by the sills, floor and under sheathing and through these flues to the center of the car where the air again enters the interior of the car through the openings in the slatted floor. When the temperature of the air around the thermostat is 46 deg. the temperature of that leaving the ice-tanks is about 35 deg. and has risen to about 42 deg. by the time it re-enters the interior of the car. It is possible to regulate the thermostat for various temperatures desired. The thermostat is connected with the valves in such a way as to close them when the temperature in the car is as low as desired. Tests made with registering thermometers show that the regulation is so perfect that the temperature changes but a few degrees in a journey of five or six days, and this regulation would undoubtedly continue as long as the ice-tanks were properly supplied with ice. The water resulting from the ice melting is trapped from the car.

Some Railroad Questions.

We gave last week, page 704, an outline of the doings on railroad day at the World's Fair. We have received since then proof slips of addresses delivered on that occasion by Mr. Ingalls, President of the Cleveland, Cincinnati, Chicago & St. Louis, and by Colonel Haines, Vice-President of the Plant System. Both of these orations are remarkably good; they are well-informed, thoughtful, and contain fine passages of sustained eloquence. We give space to extracts containing those parts of the addresses which are of the greatest present interest as expressing the views of these two influential men on the most pressing aspects of what may be called, for short, "the railroad problem."

ADDRESS OF MR. INGALLS.

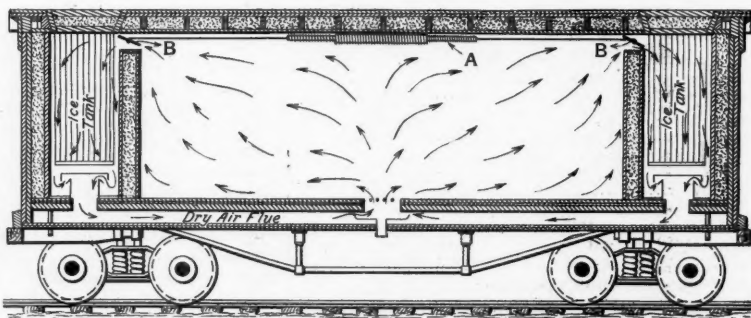
Maintenance of Rates.—To-day there is upon the statute books of the United States a law prohibiting agreements among railroads for the maintenance of rates; so that this immense interest, representing one-fifth of the entire population, is outside of the law and

obliged to maintain and conduct its business by agreements which cannot be enforced in any court in the land. This would seem incredible under all the circumstances if it were not known to be a fact. Last year, when an attempt was made to change this by a law permitting railroads to make agreements for the maintenance of reasonable rates and enforce such agreements in the courts, it was defeated in the Senate and shared the same fate in the House. The danger arising from such action is that it will force the railroads, their shippers, their employees, their owners, and every one interested in them, into politics to defend their own existence, and this certainly is not for the interest of good government, and it is a serious question which to-day ought to be considered by those who have such matters in charge whether the railroads should not be allowed to make agreements like other interests and have them enforced in the courts, trusting to the courts to protect the people in securing reasonable rates and proper accommodations.

The railroad officers are more or less responsible for this state of affairs. In many cases they have used their power arrogantly and annoyed the public, but such cases to-day are rare, and there is no class of officials so susceptible to public sentiment as the managers of railroads. The country has outgrown (or ought to) its jealousy of railroads and should accord them as fair treatment as any other interest. What the public is vitally interested in is not whether it costs 50 or 60 cents to ship a barrel of flour to New York, but in the living issue that the roads should be kept in a safe physical condition and that rates should be permanent, public and equal to all. Any agreements that will aid this should be legal and enforceable. Anything less than this is a wrong.

Through and Local Fares.—It would seem as though the limit of reduction in freight rates had been reached, that the rates on the higher classes of merchandise would have to be increased, the element of time and promptness in handling entering into this question largely. More trains will have to be run for the local passenger business and rates reduced; or else the through rates will have to be raised. The manner of making rates and handling the passenger business to-day on the through trunk lines does not mete out equal justice to the local patrons. The through passengers are carried on rapid trains, in heavy and expensive cars, and yet usually at a lower rate per passenger per mile than is charged to the local passengers who ride in less expensive coaches and on slower trains. The railroads should own their own sleeping cars and then charge a higher rate for through passengers which should include sleeping car facilities, and make the local fare, which should be good for only a seat in the coaches, at a lower rate per mile.

The Employees.—The great problem, however, of the future, and one that is pressing now upon railroad managers, is how to deal with their employees. Here are nearly a million of men, who are aggressive, well organized, who constantly want more, while the railroad officials are worried to death on the other side with the public and legislators who want to reduce their rates, and in this manner the earnings of the railroads are whittled at both ends, and in many cases there is little left. It has seemed to me that the solution of this question is by making the employees partners, or, as it is more popularly termed, "profit-sharers." For instance, suppose that a railroad earned \$10,000,000 gross and \$3,000,000 a year net, that its fixed charges are \$2,000,000 a year and its capital stock \$20,000,000; that its pay roll amounts to \$4,500,000 a year; agree then that the expenses should be first deducted, then the fixed charges, and that the balance should be divided between the \$20,000,000 of capital stock and the \$4,500,000 of capital which the employees have furnished in the shape of wages. Each would receive four per cent. upon the investment. In the case of the ordinary section laborer, this would give him at the end of the year about \$15; quite a little sum to look forward to. An engineer making ordinary wages would receive \$50; clerks in



Eastman Automatic Refrigerator Car.

the office would average \$25. If this dividend could be made regularly, employees would, in time, look forward to it and take an interest in the management of the affairs of the company and work harder for its interest. It should also be provided that in case of loss from negligence of any employee his share of the profit should be taken to repair such loss so far as it would go. If it should be thought best not to divide this fund

directly, then it could be given to the various organizations on the railroads to strengthen their funds which they use for charity and aid in case of injury. Or it might be carried into an insurance fund which should provide for worn out and disabled employees. In whatever way it is fixed, it is absolutely certain that something must be done in this country to bring the employees and the owners nearer together, and also to provide sums for the injured or disabled, and pensions for those who are worn out in the service.

ADDRESS OF COLONEL HAINES.

Possible Economies.—In the face of diminishing freight rates we are called on to handle increasing volumes of business at greater speed and with greater safety. Just as new tools and appliances and methods in other departments of industry have been so adapted to the purposes for which they are intended as to enable their possessors to undersell and bankrupt their competitors who cling to the old devices, so it must be with railroads. For the high-speed passenger trains the utmost efficiency must be sought regardless of expense. For the freight traffic the utmost economy will be required, economy as to the combustion of fuel, the utilization of steam at higher pressures than we have yet considered, the employment of heavier engines and the determination of the most economical rate of speed at which this endless procession of freight trains should move—say, from Chicago to New York—without stopping except for fuel. To do this is entirely practicable with our present stock of knowledge. It is not a question of science, but of finance.

But when this has been accomplished and the competitive traffic of large volume is handled over these new trunk lines at a cost per ton-mile which cannot be approached over the roads of antiquated construction, with grades that cannot be reduced and curves that cannot be eased, what will be the result? The fierce struggle to give the most for the least money, which is characteristic of our traffic management, will be maintained with renewed vigor. . . . The proportion of mileage in this country is rapidly increasing, which can barely spare enough from its income to pay a scant dividend to its stockholders after paying its fixed charges. Railroad corporations so restricted in income cannot, with safety, borrow additional capital for works which will not add new business, but will simply provide better and safer facilities for doing that which they now have. If they attempt it they will use the income applicable for dividends to pay the interest on their new issues of bonds. It is needless in this connection to refer to roads which barely pay their fixed charges. The force of this argument is illustrated by the statement that in 1891 less than one-fourth of the railroad stock in this country received as much as five per cent, and about 60 per cent. received nothing.

As the margin between the rate for transportation and the cost of transportation approaches the vanishing point the most serious problem with our successors on such railroads will be how to make both ends meet.

In looking over the different departments of operation it would seem that there is no great field for economy in the roadway department except in the preservation of timber, or in the locomotive department except in the better combustion of fuel and the use of steam at higher pressure, unless electric motors shall yield results not yet apparent. The use of structural steel in rolling stock should cheapen the cost of maintenance in this department, but beyond these items there is no word of promise to the railroad manager for important savings in track or equipment. The direction in which there is most to be looked for is in the better use of freight cars. When we think that the average mileage of our freight cars is but little over 20 miles per day and their average load less than three tons, of what use to talk about freight train speeds of 30 miles per hour, and of freight cars of 30 tons capacity? That our stock of a million freight cars should average no more miles in a day than a freight train can run in an hour, and that, too, loaded to only one-tenth of their capacity, is not creditable to our transportation and traffic officials. There is no problem before them of a more pressing character, and the means for its solution are in their own hands.

Employees.—There is yet another problem which in the past decade has loomed up before us and which involves considerations outside the sphere of either science or finance. It is the proper attitude of railroad corporations toward labor organizations. This is but one of the manifold aspects of the great problem of modern civilization, the relation of capital and labor. The problem as affecting railroad operations is still further complicated by the intervention of a public interest to be respected, which is not involved in ordinary industrial enterprises. The subject is one which cannot be satisfactorily treated within the limit of time now at my disposal, and I have only referred to it in this incidental way as one of those problems as yet unsolved.

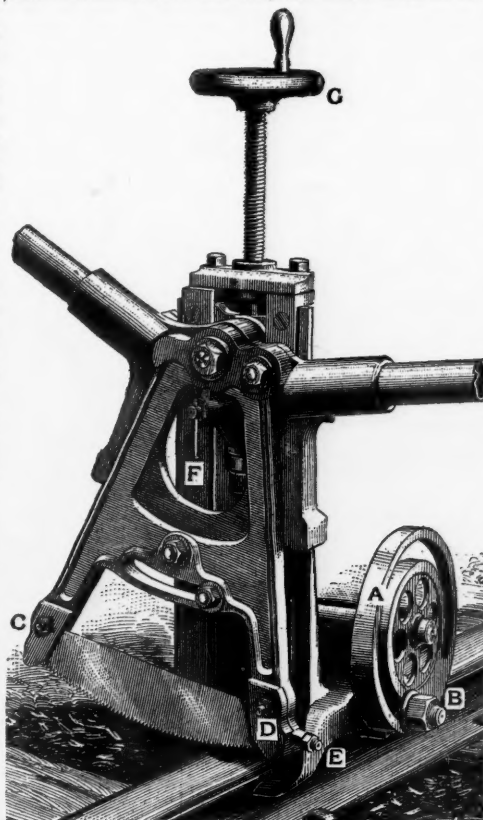
We are here in the midst of a display of the world's development in every department of nature, organic and inorganic, in every phase of human progress from primitive savagery to the latest results of modern civilization; a display as enormous as it is magnificent. So enormous indeed, so complete in its fullness of presentation, so inimitable in its artistic setting, that mankind in despair of rivaling it may never seek to reproduce it. And in this stupendous array of that which the will of God has created and the hand of man has wrought there

is no one department that sets forth the continuous advance of humanity along the lines of progress and civilization so forcibly as that which finds its most triumphant expression in the appliances for accelerated transportation. As we gaze along these rows of locomotives from the pigmies of 60 years ago to the behemoths of to-day let not the present generation forget the great debt which it owes to the stalwart champions who entered their iron steeds in the locomotive tournament that preceded the opening of the Liverpool & Manchester Railroad, and let us all who are railroad men here on this occasion glory in their great achievements and feel proud that it has fallen to us to carry on the work so bravely begun by them.

Smith's Portable Rail Saw.

We illustrate a portable rail saw which has been used with satisfactory results on a number of the large railroads for the last four or five years. It is now sold by the Standard Railroad Equipment Co., of New York, which has but recently taken hold of it. It consists of an upright frame fastened to the rail by a revolving wedge, *A*, and a hooked clamp adjusted by a bolt, *B*. The saw is fastened in a rocking frame, *C D*, and may be tightened by a straining nut, *E*. It is worked by two levers, shown in the cut. The saw may be fed or lowered by the hand screw, *G*, or automatically by turn the vise, *F*. No oil is used on the saw itself, but thick soap suds are recommended.

The machine weighs 120 lbs. It will cut a 70-lb. steel rail in from 10 to 12 minutes, and can be used on rails



Smith's Portable Rail Saw.

fastened to the ties or loose. Thin pieces one-eighth to one-quarter inch in length can be cut off, which renders the tool of great value for fitting around frogs and switches or in places where rails have buckled. It is reported that each saw will make an average of 8 to 10 cuts.

The same company sells the C. A. C. tie plate, which we have described before.

English Railroad Notes.

The main line of the London & Northwestern between Chester & Holyhead—along which passes all the Irish and Welsh traffic of the company—is, of course, and has been since first built, double throughout; but even two sets of rails are found insufficient now, especially in the holiday season, when the seaside resorts are crowded with visitors. Accordingly the engineering staff of the company will soon be engaged in quadrupling the line, at any rate over a large part of the distance between Chester and Holyhead—certainly up to the first of Stephenson's tubular bridges at Conway. No serious difficulties are involved so far, as the line skirts the coast all the way from Chester along the flat fore shore; but beyond Conway there are not only the two tubular bridges to duplicate, but some very heavy tunneling and seawalling is involved, so that this section will probably be attacked later.

The other day I had the pleasure of going over the London & Northwestern car works at Wolverton—half-way between London and Birmingham. The word "car" is used advisedly (although in England we generally speak of a "railway carriage"), because a tendency

toward a universal introduction of the American type of "car" has become quite noticeable, even on the conservative London & Northwestern. So far, indeed, as that is concerned, the new corridor train of this company—running between London, Liverpool, Manchester and Scotland—is considerable of an advance upon anything we have yet had in this country, even compared with the Pullman cars on the Midland. One can literally walk from end to end of the former, which is vestibuled throughout, while the Pullmans on the Midland and other lines are isolated from the rest of the train. Some of the Northwestern cars—notably the third class—are, however, built on the corridor compartment principle, the center aisle being preserved in most of the first class and dining cars. Standing out in marked contrast to the new rolling stock is an old royal saloon built 50 years ago for the then Queen Dowager, and still preserved at Wolverton by way of a curiosity.

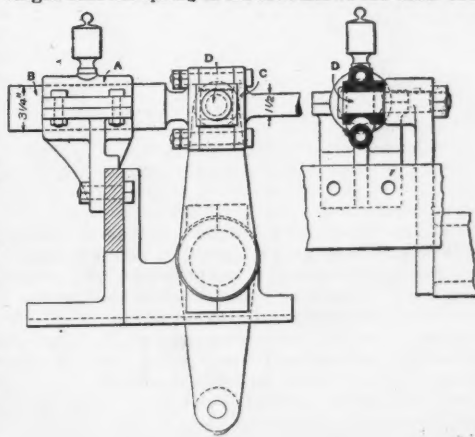
It seems curious that efforts to increase the good looks of railroad stations and to make them more pleasant and attractive to passengers should come from outside the railroad companies themselves. One would think that the latter would make it a matter of special policy to cultivate among their employees and station agents a desire to keep the railroad premises not only tidy but attractive. The Midland has certainly for some years taken steps in this direction by offering small prizes for the best kept and neatest looking station, and it would in consequence be hard to find a road on which the stations are as a rule brighter or more tidy. It has fallen, however, to *Tit Bits*—the well known journal *amateur* of England—to offer a money prize of some value (\$50) to the station agent with the best looking gardens, etc., and the money has been won by an employee of the North Eastern, stationed at Brough, near Selby. When it is stated that the prize winner has spent hundreds of pounds on greenhouses and gardening one would hardly grudge him a still bigger reward especially if he saved the money out of his wages. An expense of this kind, however, is one which ought fairly to be chargeable in great measure to the railroad company itself, and probably a move in this direction will follow.

The Manchester Ship Canal has not certainly attained the notoriety of the Panama "ditch," but most people on both sides the Atlantic have heard of it as a costly and perhaps useless undertaking. In its course of 40 miles or so it crosses one or two main lines of railroad; and since the latter run at no great elevation above sea level—certainly not enough to clear the masts of an ocean steamer—they have, perforce, been raised and the grades up and down to the new bridges, which have been built, make, according to the railroad companies, a very serious difference in the expense of working the traffic. However, deviation lines were finished, and then the canal company became anxious to obtain possession of the old lines, so that the canal might be completed. The railroads would not consent to this without sufficient compensation, and claimed £550,000, or, say, 2¼ million dollars. This amount was reduced to £450,000, and the canal company had actually to deposit with the railroad companies' bankers a sum of £388,000 (or nearly two million dollars) in order to get possession of the old lines and keep their staff at work without waiting a final settlement. Of course the matter went to arbitration, and Lord Balfour sat for more than four weeks to hear both sides. His decision, just rendered, is decidedly in favor of the canal company, who are called upon to pay £63,991 (\$320,000) to the London & Northwestern for the deviation of its main lines to Scotland; £31,360 (\$160,000) to this company and to the Great Western jointly for the deviation of their Birkenhead joint lines; and £5,310 (\$26,000) to the latter company in its own right. The total sum awarded amounts, therefore, to £100,661, or approximately half a million dollars, which would seem quite enough for the extra coal burnt, and for the greater wear and tear of rolling stock in going up the grades to the bridges over the ship canal. The cost of settling the dispute was \$125,000, including all the expenses of the arbitration. A good haul for the lawyers!

F. B. L.

Valve Rod Guide—Delaware, Lackawanna & Western.

Generally the valve rods of locomotives are of such length that the spring of the rods allows the back ends



to be raised and lowered, by reason of the rocker arms moving in the arc of a circle, without causing serious difficulty; and rigid connections may be made between the rods and rocker arm. When the valve rods are short, however, such a connection cannot be used and a device must be used which will permit the valve rod to move horizontally and the rocker arm to move in the arc of a circle and provide for a sliding motion between the two.

The method adopted by the Delaware, Lackawanna & Western is shown in the illustration, referring to which *B* is the valve rod extending back of the rocker arm through the guide *A*. The guide keeps the valve rod always horizontal. At *C* the valve rod is provided with suitable guides, in which slides the block *D*. This block has a rigid pin connection with the rocker arm; as the rocker arm rotates and works the valve rod horizontally the block *D* slides up and down in the guides *C*.

Hydraulic Car Lift.

We illustrate a hydraulic car lift recently designed for and to be erected in one of the shops of the Delaware & Hudson Canal Company.

The lifts are supported from the roof trusses of the car shop. The lifts, of which two are required for carrying or lifting both ends of a car, are mounted on a track made of 15-

in. cylinders through air brake hose leading from a 1½-in. supply pipe, which is carried on the lower member of the roof truss. Each cylinder hanger or carrier consists of two 3×1½-in. wrought iron bars, the lower ends of which are forged or turned to 1½ in. in diameter and pass through rings on the cylinder castings. The upper ends of these bars are hooked or headed, as shown in the cut, and are securely bolted between two horizontal 6×1½-in. bars about 4 ft. in length. At 18 in. each way from the center of these bars are brass bearings which serve to carry the hangers upon axles spanning the distance between the I-beam girders constituting the track. Upon the ends of these axles are keyed small cast iron wheels flanged on both sides and running upon the girders. At one side of the track gears are mounted on each of these axles, both meshing with a small pinion carried between them on a smaller axle

Fig. 2 shows the axle-chain wheel and gearing used to propel the lift along the track, fig. 3 the small cast iron wheel used on the main or driver axles, and fig. 4 the axle itself.

Fig. 5 shows a section of the piston and plans of the bottom plate, spider, and top or follower plate. The piston packing is of the cup-leather type, the usual form for hydraulic work. The piston rod is shown in fig. 6. This rod is 2½ in. in diameter and provided with a plain forged eye at its lower end. The piston head fit is 2¼ in. in diameter, and the rod held in place by means of a nut and key. The upper end of the piston has a small eye, by means of which the piston and cylinder head can be supported from above for examination or for the renewal of the packing. Fig. 7 gives a section and elevation of the cylinder and shows the construction of the hanger.

Railroad Matters in Chicago.

Passenger Traffic.—The result of the past week's business was very satisfactory. Never in the history of the Western group of railroads centering in Chicago did they bring to and carry away from the city as many people as they handled from Sept. 18 to 23, both inclusive. In an interview with General Manager Earling, of the Chicago, Milwaukee & St. Paul system, he said: "For once our passenger equipment was over taxed. The daily arrivals of passengers over our line were about 6,000, exclusive of regular local business, and we carried out about as many. The most reliable information we can gather from the sections traversed by our road encourages us to look for a heavy passenger traffic until the close of the Fair. Our other passenger business is also better than at any preceding time this year and much better than we dared hope. Hence, despite the low rates at which World's Fair visitors are carried, our passenger earnings show a large increase over any corresponding period, although business a year ago was unusually good. The fact that the trains are large and run in sections and the cars are well filled, lessens the cost of operating."

General Manager St. John, of the Chicago, Rock Island & Pacific, said: "We have no idle equipment and we could fill more coaches if we had them. On the 20th and 21st instant we brought 7,600 passengers to the city from Iowa alone. This was only a part of our business, as travel here from all directions is unprecedented. Our business west of the Missouri River is also very heavy because of the recent 'Cherokee Strip' boom. The latter, of course, will soon be over so far as the rush is concerned, but the outlook for travel from our southwestern lines is good. Our passenger earnings the second week in September increased \$97,054 over the same week in 1892, and the third and fourth weeks promise still larger results."

General Manager Merrill, of the Burlington system, said his entire passenger equipment was in active use,

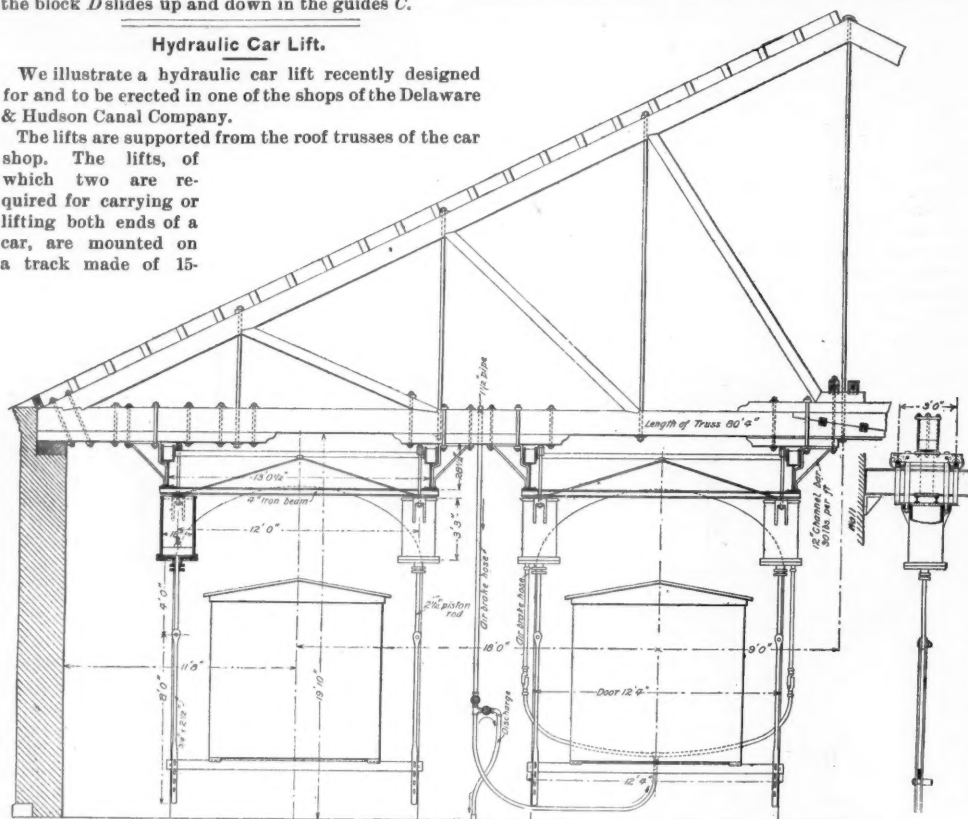


Fig. 1.

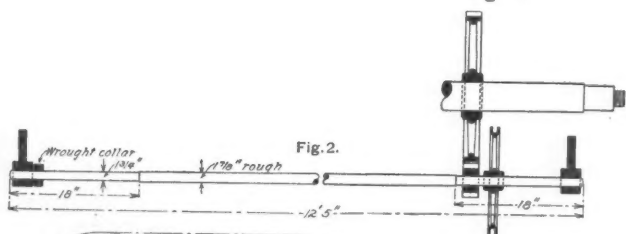


Fig. 2.

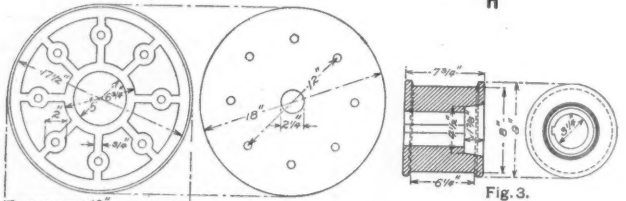


Fig. 3.

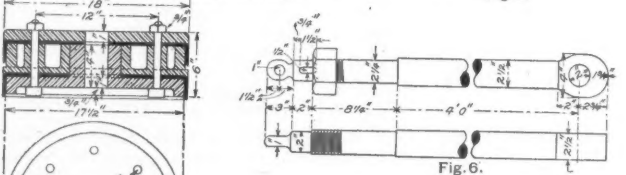


Fig. 4.

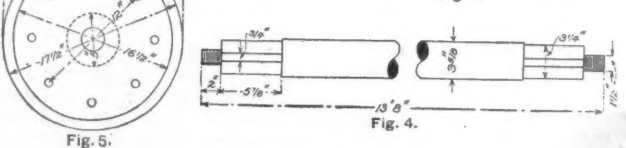


Fig. 5.

Hydraulic Car Lift—Delaware & Hudson Canal Co.

in. I-beams, and running longitudinally with the shop. This track is suspended from the lower member of the roof truss by wrought iron brackets, depending from the truss and braced by heavy channel iron braces.

Hanging vertically from these I-beam tracks by wrought iron hangers are the hydraulic cylinders, 18 in. in diameter, of cast iron, with a piston travel of about 28 in. Further vertical adjustment is made by means of the slotted hanger, which is attached to the lower end of the piston rod and carries one end of the cross-bar on which the end of the car rests. Water is supplied to

and made to rotate by means of a chain wheel upon the same shaft.

In addition to the axle connection the opposite hangers are connected by means of two 4-in. I-beams bolted to wrought iron bars passing across the top of the cylinders, and by 3×½-in. bars attached to the same pieces directly beneath the axles, latticed together and rising at the center to support the centers of the axles.

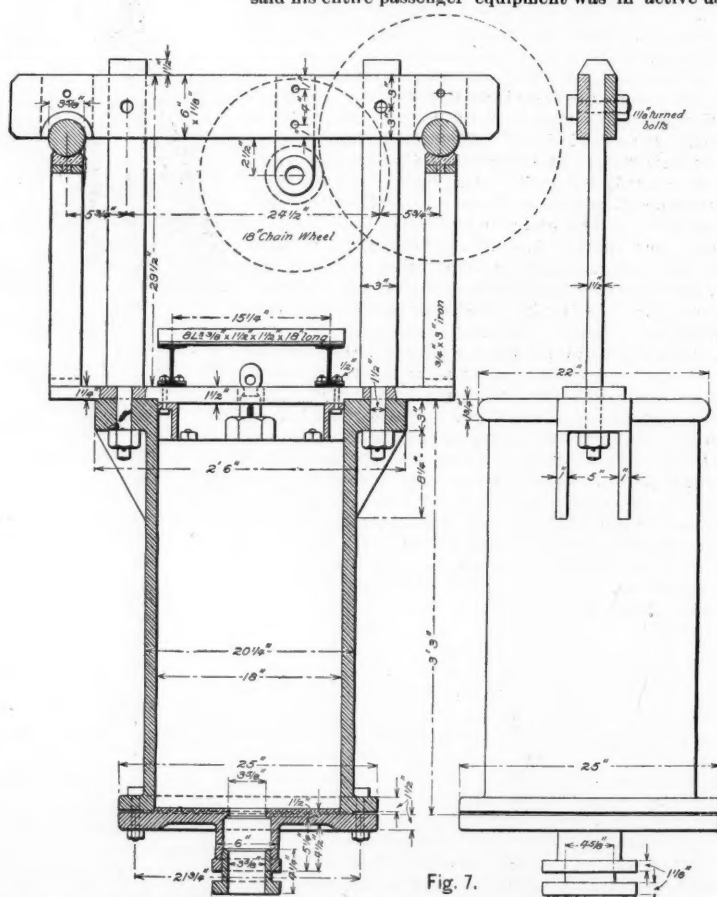


Fig. 7.

and that they brought over 8,000 people here from Iowa when that state had its day at the Fair. The daily average brought in for the past week was little below that figure, and trains to the country were equally full. He said that while the large number of passengers carried was giving the line heavy earnings, he did not think the reduced rates materially stimulated business over his or other Western roads. He believed that the rail-

roads would have made more money had they adhered to the rates put in force May 1. Other officers who were mainly instrumental in securing the reduced rates also admitted that they were a little hasty, and that the earnings of their roads would have been much larger had not their impatience for business induced them to work for a reduction. They were not disposed, however, to either advance or lower rates. In fact, the former would be bitterly opposed by public sentiment, and the latter bad policy for the railroads. Hence no further reductions are likely.

A representative of the Chicago & Northwestern said the road had all the passenger traffic it was competent to handle, and it would be yet greater if it had more coaches. Their sleepers on through trains from the Missouri River and the Northwest are equally as crowded as the day coaches. He was confident that despite the low rates at which passengers are carried the September earnings would show the largest aggregate in the history of the road, and that they would be nearly if not twice as heavy the coming month. The Atchison, Topeka & Santa Fe officials, who a short time since complained that they had over 100 idle passenger coaches, now state that their equipment is all in commission and their coaches well filled. The officers state that the interior passenger traffic of the entire Atchison system is showing surprising improvement, and that with their expanding earnings from other traffic they feel confident of bringing the receipts of the line for the last quarter of the year close up to the large business for the same months in 1892.

Freight Traffic.—The freight traffic of the Western roads, while not on a proportionate scale with the passenger business, shows a marked increase both in the volume of property carried and the cash receipts as compared with the business of the past few months, and a number of lines say their rolling stock is all in service. The management of the Rock Island system stated that its earnings from freight promise to compare well with the large business of September, 1892. In addition to the heavy outward shipments of merchandise and mixed freight the road has a large coal tonnage to the West and Southwest. The early movement of that article is accounted for by the fact that the neglect of Western dealers who are supplied with hard coal from this market deferred obtaining supplies last year until very late, and were in consequence caught without stock when it was most needed. Trouble with miners in Kansas has also materially reduced the output of soft coal in that state, and large quantities are now going there from the mines east of the Missouri. Other roads made like statements as to coal shipments west and northwest. The outward movement of other freight is also heavy, the majority being merchandise and other first and second class that pays fair profit.

The inward traffic of the roads was surprisingly large. The deliveries of grain by the 11 lines aggregated 7,967,000 bushels, an increase of 1,141,000 bushels over the week immediately preceding, and 631,000 over the heavy deliveries the week ending Sept. 24, 1892. There is also an excess of 16,502 tons in the receipts of flour and miscellaneous farm products. The only shrinkage compared with a year since was on livestock, but the loss on that class of business was not sufficient to offset the gains on the other traffic. Railroad officers are also sanguine of a continued large business through October. Northwestern and St. Paul managers state that the demand for cars to carry wheat is rapidly increasing, and the movement of other farm products will also be heavy. In brief it is said that the only class of inward freight that is likely to show a decrease from last year is wheat, and the falling off there will be more than compensated by other business. The movement of grain at other points also compares well with a year ago, the aggregate deliveries at eight Western markets the past week being 14,261,000 bushels, against 14,475,000 bushels the same time in 1892. The outlook for the more distant future is satisfactory to the officers of all lines except those whose chief business comes from Illinois, where there is an acknowledged shortage in the corn crop, but Iowa claims the largest yield of that grain ever grown, and good average crops are reported in Kansas, North Missouri and Nebraska.

The following were the receipts of grain and flour at Chicago by 11 railroads for week ending Sept. 23 and same time in 1892; also the amount brought by each line:

By—	1893.		1892.	
	Flour.	Grain.	Flour.	Grain.
C. & N. W.	Bbls. 11,474	Bush. 1,364,000	Bbls. 15,544	1,108,000
Ill. Cent.	4,350	1,076,000	250	991,000
C. R. I. & P.	28,050	1,062,000	3,625	986,000
C. B. & Q.	30,750	1,998,000	27,361	1,702,000
C. & Alton	8,554	449,000	9,742	274,000
C. & E. Ill.	471	163,000	150	265,000
C. M. & St. P.	20,400	902,000	21,750	886,000
Wabash	1,200	290,000	11,840	251,000
C. & G. W.	13,847	116,000	24,359	473,000
A. T. & S. Fe.	3,376	482,000	600	381,000
L. N. A. & C.	34,000	19,000
Totals.....	112,468	7,967,000	115,221	7,336,000

The receipts by Wisconsin Central were too small to report.

CHICAGO, Sept. 25.

TECHNICAL.

Manufacturing and Business.

The Shiffler Bridge Co., of Pittsburgh, is to erect a large blacksmith shop for H. K. Porter & Co., locomotive builders.

The Acme Track Jack Co. has been incorporated at Chicago by James J. Barkley, H. M. Anderson and R. Wilkerson.

The Erie Car Works, Limited, of Erie, Pa., have been sold for \$34,000 to the First National Bank of Erie, which held a judgment for \$93,000.

The Haskell & Barker Car Works, at Michigan City, Ind., have resumed operations.

The Ottawa Car Company, with a capital of \$200,000, has been incorporated at Ottawa, Ind.

The Pittsburgh Tool and Steel Company, with a capital of \$100,000, was chartered Sept. 18 at Harrisburg, Pa. The directors are: John C. Jamison, David H. Summers, Richard W. Bailey, Pittsburgh, Pa.; David P. Thomas, Alex. M. Johnson, Wilkingsburgh, Pa.

The Foster Engineering Company, of Newark, N. J., has received an order for twenty-three 2-in., two 3-in., two 4-in. and four 5-in. Foster reducing valves for the United States battleship "Massachusetts," Cramp & Sons, builders. These valves are to be made of special composition.

The Baltimore Terminal Warehouse Company has given the contract for the large warehouse to be erected on North Pleasant and Davis streets to S. H. & J. F. Adams. The building is to be completed by next spring.

J. E. Forsyth, the organizer and for years the successful General Manager of the Hinson Car Coupler & Manufacturing Company, and E. R. Merrell, of the same company, have resigned to organize the J. E. Forsyth Railway Supply Co., of Chicago. Mr. Merrell will be General Agent.

The Miami Valley Fuel Gas Co., of Piqua, O., has contracted with the Laidlaw-Dunn-Gordon Co., of Cincinnati and Hamilton, for two pair cross compound Corliss engines with compound gas compressors; also for feed pumps, heaters, condensers and pipework. The sizes of the engines and compressors are 22-in. and 40-in. steam cylinders and 16-in. and 32-in. gas cylinders, all 48-in. stroke. These compressors are used for taking the gas from the wells and forcing it through the lines to the various towns the company is supplying. The plant will be erected at Fort Recovery, O.

Iron and Steel.

The plate and bar mills of the Spang Steel Co. have been started on double time.

The rail and No. 1 blooming mills at the Pennsylvania steel plant were shut down Sept. 22.

Work will be resumed at the Duquesne tube works Oct. 1.

The Hamilton Iron & Steel Co., Hamilton, Ont., with a capital of \$1,000,000, is seeking a charter from the Canadian Government.

New Stations and Shops.

The new passenger station of the Dunkirk, Alleghany Valley & Pittsburgh at Warren is completed.

Harvey & Purdy, of New York City, have made the plans for the new Delaware & Hudson passenger station on Lackawanna avenue, Scranton, Pa. They provide for a four-story brick and steel building, 100 x 75 ft.

The New Lock in St. Mary's Falls Canal.

Gen. O. M. Poe, United States Engineer, has opened the bids for the new lock, comprising five pairs of gates, with pumps, anchorage connections, etc. The Detroit Bridge & Iron Works was the lowest bidder, its price for the estimated quantity of material required being \$182,612. The work is to be completed by Nov. 15, 1894.

A Great Bridge Enterprise.

We learn that it is proposed to build a cantilever bridge of 1,800-ft. clear span across the Ohio River at Cincinnati. Mr. G. W. G. Ferris, the engineer who has acquired additional fame as the designer of the Ferris wheel, is the engineer of this bridge project. The span of 1,800 ft. will be 90 ft. longer than the longest spans of the Forth bridge.

Bids for "Soo" Canal Gates.

Bids for the gates required at the new lock in the St. Mary's Falls Canal were opened at Detroit on the 19th inst. by Gen. O. M. Poe. Six bids were received. The lowest was from the Detroit Bridge & Iron Works, of Detroit. Their total was \$182,612. About three-quarters of the material is steel, which is offered at 5.9 cents per pound. Ritter & Connolly, of Pittsburgh, bid 6.75 cents on this item, and the King Bridge Company, of Cleveland, bid 7 cents.

The Louisville & Jeffersonville Bridge.

The Cleveland, Cincinnati, Chicago & St. Louis Railroad Co., with the Chesapeake & Ohio and the Mackey system, has secured control of the Louisville & Jeffersonville bridge, work on which was suspended in 1890, and work has been resumed and will, it is believed, be carried on now to completion. This enterprise has had some serious vicissitudes. Jan. 10, 1890, the air escaped from a caisson and the water entered, drowning 14 men; only four of those who were in the caisson escaped. The contractors for the foundations at that time were

Messrs. SooySmith & Co., but they were relieved from responsibility not only by the verdict of the coroner's jury but by the sum of opinion among engineers. Work was finally suspended in November, 1890, after the completion of the piers.

The present condition of the work is as follows: All metalwork of the Jeffersonville approach is in place ready for the wooden floor system, as is also the first river span on the Jeffersonville side, 210 ft. center to center of end pins. Work is now being started at the Louisville side of the river. Metal for the first 342 ft. 6 in. span will be put in place this week and the rest of the river spans will be pushed to completion.

The contractors for the superstructure are the Phoenix Bridge Co. The bridge is 1,653 ft. long between the shore piers, and the total length, including approaches, is 9,194 ft. Beginning on the Indiana side the bridge is made up of the following structures: A deck viaduct 4,063 ft. long, 1,000 ft. of which is double track; then six through, single-track spans of 210, 550, 553, 550, 341 and 341 ft. respectively; then there is 2,586 ft. more of deck viaduct. In the through spans the trusses are 30 ft. between centers, and the longest ones are 84 ft. high between pins. The deepest foundations went about 80 ft. below low water.

A Street Railroad for Cairo.

Cairo, Egypt, is to have a new street railroad system, and the Egyptian Government has invited bids for its construction. The matter is attracting some attention among European capitalists, and there is likely to be active competition. Bids will be received by the Minister of Public Works in Cairo up to Feb. 1, 1894. American investors can obtain full information on the subject at the State Department, Washington.

Electricity on the Erie Canal.

It will doubtless be remembered that the New York State Legislature has appropriated \$10,000 for experiments in the application of electricity for towing on the canals of the state. The Superintendent of Public Works has just given permission to the Westinghouse Electrical & Manufacturing Co. to inaugurate and conduct experiments on electric towing on the Rochester level at Pittsford, and the tests will shortly begin. Trolley wires will be strung over the middle of the canal and the power conveyed to the motor through transmission wires so arranged as to allow free lateral movement of the boats.

The National Hollow Brakebeam.

One of the features of this company's display at the World's Fair which is to be particularly appreciated at this time, when re-enforced brakes are coming into use, is a brakebeam of unusual proportions and designed to work with a pull on the rod of 30,000 lbs.; with such a load the brakebeam deflects only $\frac{1}{8}$ in. This beam has been designed for use on cars provided with the re-enforced brake, as with such a brake the pressure that may be used to hold the brakeshoes to the wheels and not cause slipping of the wheels on the rails is dependent upon the speed of the train, until a comparatively low speed is obtained, and is much greater than 90 per cent. of the weight on the wheels for which the first beams were designed. In this beam the truss is 15 in. deep, the pipe used for the compression member is 3 in. in diameter and the tie rod is $1\frac{1}{2}$ in. in diameter.

The old type of beam, that designed for equipment of passenger and freight cars, is also exhibited as made for cars of standard and other gauges, and there are also brakeheads of different design for various roads.

There has always been more or less difficulty in so hanging brakebeams as to give even wear through the length of the shoe; to meet this difficulty the National Hollow Brakebeam Company has designed and has placed on the market a beam with a self-adjusting head. Each end of the pipe that forms the compression member of the beam is provided with a sleeve, the ends of which are greater in diameter than the middle, and between the two collars thus formed the surface of the sleeve is corrugated to receive similar corrugations in a pawl in the brakehead, which is pressed against the sleeve by a coiled spring. In this manner the head is held in position in a horizontal plane and also in a vertical plane, unless one end of the shoe presses the wheel more than the other, under which conditions the head and pawl will turn in a vertical plane around the sleeve and adjust the shoe to the wheel. A cutter serves also to hold the head from slipping off sideways. This beam has met with some favor on the Pennsylvania Railroad, and the company expects much success with it.

The St. Louis & Chicago Electric Railroad.

The latest news that we have of this enterprise indicates that the hat is still going around. At a meeting of the Board of Trade of the city of Alton, Ill., held recently, a proposition from the company was brought up. It is to divert the line of the road so as to pass through Alton. Dr. Adams and Prof. Nipher were present to explain the project. They said that arrangements had been made to use Mr. Morrison's new bridge across the Mississippi at Alton, and that if the route from Wagoner to Alton is found to be as good as that from Wagoner to East St. Louis the Alton route will be used. The people along this latter proposed line are said to have raised \$600 toward the expenses of a survey, and the city of Alton was asked to contribute a like sum. A committee was appointed to solicit subscriptions.



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EDITORIAL ANNOUNCEMENTS

Contributions.—Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies in their management, particulars as to the business of the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and railroads, and suggestions as to its improvement. Discussions of subjects pertaining to ALL DEPARTMENTS of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.

Advertisements.—We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay, EXCEPT IN THE ADVERTISING COLUMNS. We give in our editorial columns OUR OWN opinions, and those only, and in our news columns present only such matter as we consider interesting, and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes etc., to our readers can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.

On another page is such a summary of the report of the Massachusetts Railroad Commissioners on the Chester Bridge accident as will give their findings and recommendations. There appears to be little for us to add to what we said Sept. 15 except to emphasize the fact that there was a most astonishing and, so far as we know, unexampled want of supervision on the part of the railroad company. This serene and childlike abandonment of responsibility into the hands of the contractor is most unusual, and it indicates a remarkable conception of duty on the part of the railroad officers. Our own diagnosis of that part of the case is that it is the direct result of an undue and unusual subordination of the engineering department of the railroad; of a failure on the part of otherwise enlightened railroad officers to appreciate what an engineering department should be and indeed what it is on railroads conducted in the modern way. If this accident does not lead to a considerable change in organization and in administrative functions on that road we shall be surprised. There is still another point that we would emphasize, although this too was brought out in our former comment on this accident, and that is that it was not merely unusual, but unpardonable, to attempt to do such a piece of work and continue to run trains over the bridge without falseworks. Of course, as the Railroad Commissioners suggest in their report, it would be quite practicable and reasonably safe to carry on the work without falseworks if all other proper precautions were taken; but those precautions require the constant presence on the ground of some officer of the railroad company who has enough discretion and intelligence and authority to know when the bridge is unsafe for trains and to compel all trains to slacken their speed or to stop entirely if, in his judgment, they should do so. Of course, all things are relative. In repairing a bridge across the gorge of Niagara, one would necessarily adopt the latter plan, and, as the whole world knows, the old suspension bridge there was renewed, lock, stock and barrel, without falseworks and without stopping traffic, and the deed ranks as one of the most brilliant in the history of engineering. But every step was taken under the eye of the one responsible man who conceived and executed the work. He gave a standing order that the gangs should not quit work either at noon or at night until he had actually looked at the work and personally given them leave to go. There was never the least lapse of responsibility. In the Chester case, however, there was no reason for not using false works but that of economy, and as the height from the lower chord to the bed of the stream was only about 20 ft., the cost of adequate falseworks would have been trivial. Such being the case, it was an astonishing and entirely uncalled-for risk to attempt the repair of the bridge without using them.

The Dykeman's and Long Island Collisions.

We print on this page* the findings of the New York State Railroad Commissioners on the collisions near Dykeman's and near Long Island City, the principal facts concerning which have heretofore been published in the *Railroad Gazette*. The Commissioners present good diagnoses of both cases, and their conclusions are in the right direction, but the reports will be criticised, we think, on the ground that they recommend too much. They go into a variety of possible—we might say even problematical—means for preventing collisions, but they do not get down to particulars concerning the main remedy for the specific cases under consideration. Numerous well known safeguards in railroad operation are highly desirable, but financially or otherwise impracticable. At all events, it is generally impossible without compulsion to induce superintendents to adopt some of those referred to in these reports, and compulsion by legal means is out of the question where such minute and technical details are concerned.

The first recommendation in the Dykeman's case "goes without saying." The Commissioners might well have gone further, and have said that the requirement that the station operator repeat the order back at once from the manifold copy be rigidly enforced. There seems little doubt that this clause was disobeyed in this case. The operator seems to have been unable

* NEW YORK RAILROAD COMMISSIONERS' REPORTS ON COLLISIONS.

The New York State Board of Railroad Commissioners has made public its finding in regard to the collision on the Harlem division of the New York Central & Hudson River Railroad, between Dykeman's and Ice Pond, on Aug. 26. The Board finds that the accident was caused by the error of William W. Wakeman, the assistant agent and operator at Towners, in substituting "Dykeman's" for "Ice Pond" in the train dispatcher's order as the meeting point of the two trains which came in collision. The train dispatcher, Dunne, sent the order simultaneously to Dykeman's and to Towners, and on its being repeated from Dykeman's he put it in writing for the first time. The repetition from Towners was then checked with what had been written, by underscoring each word. There is no question that the dispatcher intended to write "Ice Pond," and Dykeman's so repeated it. This makes the presumption strong in favor of the dispatcher, although Wakeman claims that in repeating he wrote Dykeman's. The Commissioners speak of Dunne as habitually exercising care in attending to the repetition of orders. Wakeman is 36 years old, and had been Assistant Agent at Towners for so long, and had made so good record, that he had been marked for promotion.

The Board recommends (1) that the requirement of Rule 509, that operators called for attention to train orders shall listen to the repetition of the orders by other stations, shall be rigidly enforced; (2) that the rule be amended so as to require that the train dispatcher shall first write his order before sending it and (3) shall check the repeated order by his original order in writing, and (4) that the rule be further amended so that the conductor shall be required to telegraph to the train dispatcher what is his understanding of the order received by him and shall not move his train until the train dispatcher shall subsequently order him to do so. The report says: "The saving of time is unquestionably essential in the operation of a single-track road, but time gained at the expense of safety leads to disaster. Had the requirement that the conductor should telegraph what his understanding was been in force, the accident under consideration would not have occurred."

The Commissioners published on Sept. 14 their findings in the matter of the collision on the Long Island Railroad Aug. 26.

This division of the road is under the block system, and at the point in question block tower No. 6 was operated by Charles W. Hessner and block tower No. 5 by F. J. Knott. The Board finds that Mr. Knott was primarily at fault in giving the signal for the Rockaway Beach train to enter upon block No. 6 too soon after he had given the Manhattan Beach train the signal to enter block No. 5 from block No. 6. The Board also finds that James McCormack, the rear brakeman of the Manhattan Beach train, contributed to the accident by his failure to go back with his red light to a point as far as the time would have permitted him to go. It appears that the home signal with which Knott made the mistake is 820 ft. from his tower, and that the high bluff between the tower and the signal obscures the signalman's view of a train from a point 50 ft. east of the signal nearly up to the tower. It is believed that the Manhattan train stopped at this signal only about 90 seconds. The length of the block section is about 3,700 ft. The evidence seems to show quite clearly that the rear brakeman of the Manhattan train did not carry out Rule 98 as thoroughly and intelligently as he might have done.

The Board recommended (1) that home signals be located so as to give the best possible view to the engineer of the approaching train; (2) that cars and engines in the passenger service be equipped with automatic air brakes; (3) that that portion of the road operated by the block system be equipped with an automatic track circuit signal; (4) that the rules be amended so as to require that in all cases where it is necessary for a rear brakeman to go back for the purpose of protecting his train, he shall continue back until he meets the next approaching train or reach the next tower, this to apply to the portion of the road controlled by the block system only; (5) that home signals be located at the nearest possible point to the tower from which they are operated; (6) that when the home signal is beyond the tower a clearance signal for the preceding block shall not be given until the markers on the rear of the train have passed such home signal, and when the home signal is before or at the tower the clearance signal for the preceding block shall not be given until the markers on the rear of the train have passed the tower; (7) that all employees in towers and trainmen shall be subjected to a rigid examination as to their qualifications for the respective positions they are to occupy and their habits of life, and (8) that a strict supervision be exercised over them.

to copy the message as fast as it was sent, and therefore took the risk of repeating it back to the dispatcher before he had written it down. If the blunder occurred in this way, the listening of other operators would not have averted the collision in this case.

The second recommendation is good, but exceedingly hard to enforce. Where a dispatcher has an operator constantly to assist him the rule should be rigid; but where he must wait until after he has completed the writing before the transmission of the order can be begun, the aggregate of delay is often so great that it is doubtful whether the increased hurrying does not counteract any benefit derived from the writing out process. Every dispatcher whose work is at all heavy should have an assistant operator. The transmission of orders is frequently interrupted, and the interruptions distract and annoy the person who is sending. Even if these annoyances do not consume valuable time the total effect of a number of them in the course of a day on the mind and patience of the dispatcher is certainly objectionable and ought to be avoided. A dispatcher who has plenty of work is under constant temptation to hurry his sending, and however careful his disposition he may be led into the dangerous practice of sending faster than the receiving operator can take; and the disposition of the latter to try to conceal his deficiency is, of course, ineradicable.

The third recommendation is obvious if the second is carried out. The fourth includes not only the usual rule to place the order for the superior train first, but also contemplates the writing out by the conductor of a message in his own words giving his understanding of every order. We doubt very much whether a superintendent selected from among the angels, with every conductor a Spencerian penman, could enforce this provision, with any permanent success; but whether he could or not, it is doubtless a fact that the present practice is in the long run better. On this point "The Train Wire," by Mr. J. A. Anderson, a most thorough and careful man, says:

In early days of train telegraphy, when orders were not prepared with the precision of the present day, it was the custom to add to the order the phrase "how do you understand?" This came to be represented by a signal, the most generally used perhaps being the numeral "31." The reply to this, preceded by "we understand we are to," represented by "13" or other numeral, was required to be written out by the trainmen as their "understanding." This was probably in most cases a verbatim copy of the order. Whether this was actually done by the conductor and engineman is doubtful. Some allowed the operator to do it. With the definite forms of order now used and well understood, there is certainly no necessity for men to write out their "understanding." The manifold copies, authenticated by repeating back and compared by reading aloud, which also serves to impress the order on the men, must certainly be better than anything written by or for them. There would seem to be no reason for perpetuating a fiction by referring to the repeating of the order as the "understanding" or by the use of "31" and "13" in their original sense, when the question and answer which they represent are no longer designed to be used, and this practice and the expressions which arose under it have almost entirely given place to the improved methods.

The reading aloud and the repeating direct from the manifold will be admitted by most people to be sufficient, if enforced; and these provisions can be enforced, if the attempt is made, much easier than any requirement like that suggested by the Commissioners in this case.

But assuming that a railroad cannot, or will not, maintain the present system at the ideal standard, the remedy here proposed is not the best. The staff system, or the block system, which is the same in principle so far as the present question is concerned, is the more feasible safeguard to adopt. No one can defend our dispatching system as a safe system, except with the proviso that the men employed to carry it out shall be highly intelligent and well trained; but very rarely do we hear of a collision where there was not some dereliction, showing that the person at fault was either below the requisite standard in natural ability or else had been allowed to work without suitable training or inspection. There is much loose or sentimental talk about the worst mistakes being made by the best men, but the record of those defaults which get into print do not sustain this view. Possibly the staff system or its equivalent would be necessary to secure the desired degree of safety, even if the dispatching system were at its best on every road in the country; but with things as they are, every new collision indicates a very clear demand for it.

In the Long Island City case the first recommendation is good, but not revolutionary. The signal in question is on a curve. It often happens that a signal must be on a curve, in which case the proper precaution is the erection of a distant signal. In fact, the absence of a distant signal is one of the chief points to be criticised at Long Island City, though this probably did not contribute to the present collision. The second recommendation is very important, but

it is of doubtful applicability to the case in question, as, according to the testimony of the engineman, he did not see the train ahead of him until he "was right upon it." The best brake in the world would therefore have done him little good, though it might have mitigated the accident.

Compliance with the third recommendation would help matters, but we question the Commissioners' competency to discriminate between a track circuit and a wire circuit, or between an automatic system and a non-automatic with Sykes locking. These are nice points on which the highest experts do not agree. Moreover, the chief point of inquiry just now should be how to get along where \$500 or \$1,000 a mile for automatic signals cannot be afforded.

The fourth recommendation states the case in a way which very well illustrates the impracticability of flagging where trains follow each other very frequently. If the flagman actually stops the following train every time he goes back he simply produces so many delays that all the saving in time effected by the block system is neutralized. The fifth point is probably a criticism which the Long Island road well deserves, as the signal and the tower were not well located as respects each other. The sixth point is obvious.

The seventh and eighth recommendations touch the vital point in the Long Island case. It is doubtful, however, whether this simple and righteous dictum will be heeded as it ought to be, on railroads generally, until it is elaborated in all its details and made the subject of special inquiry with the railroads. This matter of engaging and promoting only the best men has often been emphasized in these columns. The public will never have any accurate and comprehensive knowledge on the subject, however, until some state railroad commission takes it up and investigates it with the thoroughness which characterized the action of the British Board of Trade on the subject of hours of labor, for instance. The state cannot undertake to dictate much to a corporation as to the men it shall hire, or as to details of discipline, but it can do a useful service by giving publicity to the actual practice of the railroads, provided it will appoint competent agents to make the investigation. The New York Commissioners give no intimation that they have investigated the practice of the Long Island at any other towers than those concerned in this collision.

These last two recommendations in the Long Island case might well have been added to the report on the other collision. The regular operator at Towners presumably was competent. If the railroad company had been asked to report to the Railroad Commissioners on the qualifications of its operator at that point the report would doubtless have been a favorable one; and yet during the absence of this competent man at dinner the despatcher seems to have gone on with his business the same as though he were dealing with the regular operator. In both these collisions the primary trouble seems to have been that the work was being done by a man whom any ordinary inspector would have declared incompetent, or at least of very doubtful competency, while all the time the superintendent assumed or believed that competent men were on duty.

The Economy of the Narrow Gauge.

One of the papers presented before the Engineering Congress at Chicago was an argument for the narrow gauge for railroads of minor importance, by a German Engineer, Mr. E. A. Ziffer. An abstract of the paper was given in the *Railroad Gazette* at the time (p. 600). To an American engineer any such argument must seem superfluous at this time in the century, for, in the early seventies, the "battle of the gauges" was fought to a finish in this country. The discussion of the subject was so prolonged and comprehensive and the practical trials were so extensive that the decision seemed final. The 3-ft. gauge was left with hardly an advocate among engineers. Everyone admitted that a road that would have any interchange of traffic with roads of standard gauge must be built to standard gauge; and almost everyone admitted that if the traffic to be moved were sufficient in quantity, and if the distances over which it would be moved were long enough to warrant building a railroad at all, it would be bad economy to build it of narrow gauge, say 3 ft. Of course we do not include shop and industrial railroads built for purely local purposes. But European engineers, financiers and officers of government were not so thoroughly convinced as were the Americans, and the question of the economical gauge for secondary lines and railroads of "local interest" still burns there, and on the Continent of Europe and in the dependencies there are many miles of metre-gauge or less.

For an American to undertake to answer the ar-

guments of Mr. Ziffer, would be of about as much practical interest as to set out to prove that slavery should not be restored as an institution of the land; but it may be well enough to call the attention of the younger men among our readers to some of the faults of Mr. Ziffer's assumptions—for his argument is almost entirely assumption.

If the traffic of a railroad is to pass over other roads there can be no question that the gauges must be the same for economical results. One cannot afford to build a road so situated on an independent gauge. This has been settled by costly experience on a great scale. So we are left to consider only those roads which are isolated either geographically or by the nature of their business. Even for such railroads Mr. Ziffer claims so much that is obviously not so that his whole fabric is shaky.

He claims for narrow gauge railroads (1) saving in cost of construction, (2) saving in cost of rolling stock, (3) saving in expense of operation.

The economy in construction is claimed "principally from the faculty of narrow gauge roads to adapt themselves closely to the formation of the country and to use steeper grades and smaller radii." Why any one should say, at this day, that a narrow gauge road can use steeper grades than one of standard gauge we cannot understand. Twenty years ago even some engineers used to say it, and many promoters and investors believed it; but for 20 years we have hardly heard it even hinted by a man who dared to write C. E. after his name. In fact, so far as the gauge affects the grade at all, the result is precisely opposite; for while the gauge has no influence on the adhesion, it restricts the capacity of the locomotive, and to do a given amount of work in a given time requires more engines and more trains on a narrow gauge than on a standard gauge. It is undoubtedly true that somewhat sharper curves can be used with narrow gauges, but with the same wheel base the difference in curve resistance between a 3-ft. and a 4-ft. 8½-in. gauge is not very important, and the limit of radius of curvature is not so much in economy of construction as in economy of operation and maintenance. No man in his senses will use curves unrestrainedly, even if he is building a narrow gauge road, for he knows that they will increase the cost of every ton hauled over the road, not only by increasing the resistance, but by increasing danger of derailments and collisions, reducing speeds, and adding to the cost of maintenance.

Another element of economy in construction claimed by Mr. Ziffer is that there are possible savings in right of way, in grading and masonry and bridge work, in the size of depots and yards, in the strength of superstructure because of lighter rolling stock, in weight of rails, amount of ballast, number and length of side tracks and in the size of buildings. It will be observed that these are very sweeping claims and we wonder that the German author did not point out the fact that the smaller locomotives could be run by boys instead of men, and that burros and toy carts could be used in the little freight yards to receive and deliver the little packages hauled in the little cars. Indeed, it is not necessary to reply to such obvious nonsense; it is apparent enough that we can use lighter rails and lighter bridges on standard gauge roads if we are content to use lighter locomotives and do less work altogether.

The possibility of saving in the prism of earthwork is more serious. At first sight it is apparent that with a narrower track the banks and cuts can be narrower. But, in the first place, they must not be made too narrow for drainage and stability. In the second place, if one calculates the percentage of the total cost of building a railroad which is represented by the item of cuts and fills, and if he calculates the possible percentage of this that can be saved by reducing the gauge, he will find a surprisingly small saving between a 3-ft. gauge and one of 4 ft. 8½, if the two roads are constructed to do the same work. In fact Baron von Weber told us years ago that the Swedish engineers after a large experience with a considerable variety of gauges, found that the saving in this particular is less than 10 per cent. of the cost of construction, and disappears entirely where curves of about 1,300-ft. radius can be used with standard gauge.

When we come to consider the possible saving in cost of equipment we shall find again that narrow-gauge rolling stock will cost more for a unit of work done than that for the standard gauge; that is, the cost of a narrow-gauge locomotive for a useful ton of weight is greater than that of one of standard gauge. And so of cars, the strength of couplers, of draft gear, of trucks, of sills and of all framing cannot be diminished if they are to carry the same loads, or if they are to carry nearly the same loads, and to run at nearly the same speeds. All that the diminution of the gauge can do is to diminish the width of the car body

and consequently its capacity, and bring us back to the same point that we reached with the locomotive, namely, greater cost of the machine for the unit of work done. The cost of maintenance could be easily shown to be greater on a narrow-gauge line doing the same work, as also the cost of operation; for, to carry the same number of tons you must run more trains, consequently there are more wheels passing over your track, there are more crews employed, and obviously the greater train movement necessitates greater wear and tear and more men in various departments.

As we suggested at the outset, it seems almost like setting up a man of straw to discuss this question now, but for the sake of our younger readers in America, and for the sake of readers young and old on the continent of Europe, it seems desirable to at least point out some of the particulars in which Mr. Ziffer's paper should be very carefully examined before it is accepted as gospel.

The Minnesota State Elevator matter is becoming a *cause célèbre*. Last winter the legislature passed an act, which was strenuously opposed by certain corporate interests, providing for the erection by the State of an elevator adjacent to deep water on St. Louis Bay at Duluth. The law made it the duty of the Board of Railroad and Warehouse Commissioners to purchase the site and to have prepared plans and specifications for a suitable elevator for "receiving, storing and shipping wheat or other grain," and that such elevator must be provided with bins for storing the grain of individual shippers. Acting under that law, the Commissioners selected and purchased the site, they had plans and specifications prepared, and they advertised for and received bids for the erection of the elevator. Before the contract was awarded an application was made in the District Court of Ramsey County for an injunction restraining the Commissioners from proceeding further in the matter. Pending the order of the Court, the entire matter was held in abeyance. The case was argued last week before Judge Willis, who denied the application for an injunction. Judge Willis holds, "That the act of 1895 establishing the Railroad and Warehouse Commission, and providing for the inspection, weighing and grading of grain, was one of great beneficence. It was enacted in response to a complaint from a large body of our citizens that the ordinary methods of grading, weighing and shipping grain had caused them great injustice, great loss; it was to remedy an evil which the legislature found to exist that this legislation was enacted." It is further held, "That it is entirely proper for the State, in the exercise of its function of protecting its citizens against wrong through the exercise of police power, to establish elevators; not for the purpose of engaging in the business of storing grain, but as incidental to the inspection which is generally given to grain when it is in process of delivery to an elevator or while it is stored in an elevator, or while it is in process of shipment out from an elevator or warehouse." The Court holds that the state has the same right to build an elevator or warehouse that it would have to erect a building to serve as an office for the grain inspector, or one in which to keep the weights and measures used in connection with the inspection of grain. The Court holds, "expressly, that this elevator is not such an internal improvement as is mentioned in the constitution of the State and which the State by that instrument is inhibited from executing." After touching upon the powers of the legislature and the important place it occupies in the state government the Court says:

"The policy of the act under consideration is not for the courts in any sense of the word to determine. The policy of legislation is a matter exclusively for the determination of the state legislature. The complaint states no cause of action against any of the defendants named in the complaint. The act of 1893 imposes no restrictions upon the plaintiff. It does not curtail his liberty, he does not suffer from prospective unjust competition, since he is neither the owner nor the manager of an elevator. The complaint, *prima facie*, seems to show that the Railroad and Warehouse Commission will, in its total expenditures under the act of 1893, exceed the limit of the appropriation of \$200,000. Conceding this proposition, an administrative error, a mere abuse of authority is shown which would not entitle the complainant in this action to an injunction, under the rules of equity."

The Commission will at once proceed with the work.

The annual report of the New York Central & Hudson River Railroad to June 30, 1893, shows an increase in gross earnings of \$1,458,068, or 3.1 per cent., and the operating expenses increased 3.6 per cent., leaving an increase in net earnings of \$305,304, or two per cent. The fixed charges increased about \$280,000, leaving the net increase of the profit \$25,544. The total of the gross earnings was \$46,936,993, and of operating expenses \$32,291,877, and of net earnings \$14,644,816. The ratio of operating expenses to earnings was 68.8 against 68.47 the year before. The increase in passenger earnings was considerably larger than that in freight, the percentages of increase being 1.9 and 5.3. The total mileage operated was 2,096.46 miles. The construction and equipment account was increased \$3,404,633, standing now at \$156,989,928. Heavy purchases of equipment were made in anticipation of a large traffic on account of the World's Fair. Provision for paying for these

has been made temporarily, pending the issue of additional capital stock or the sale of four per cent. debenture bonds. In addition to this charge \$1,068,149 has been spent for new equipment, new bridges and improvements in docks and stations. This has been paid out of operating expenses. The charges to construction and equipment account include \$707,000 for block signals from Spuyten Duyvil to Buffalo, \$644,000 for land at Buffalo, and \$145,000 for land at various points. The aggregate of the new items of equipment charged to this account during the year is \$1,707,233. The freight train-mileage decreased, but the ton-miles of revenue freight increased. In 1893 this last item amounted to 3,833 million ton-miles, and in 1892 it was 3,830 millions. The passenger mileage in 1893 was 745 millions, and in 1892, 687 millions. The receipts per freight unit were slightly greater; that is, 0.71 cent against 0.70, and the expenses remained the same. The passenger receipts per unit were 1.89 cents in 1893 as compared with 1.94 in 1892, while the expenses were 1.58 in 1893 and 1.54 in 1892. The returns for the quarter ending Sept. 30, 1893, show an increase in gross of \$109,000, and in net of \$284,000.

A little variety has been introduced into the dull monotony of train robbing. Last Sunday night some of the officers of the Kansas City, St. Joseph & Council Bluffs Railroad had news that a certain passenger train was to be robbed somewhere north of St. Joseph. At St. Joseph the train was held and a duplicate train sent out consisting of engine, express and baggage car and day coaches, two of these darkened to simulate Pullmans. The train carried as sole passengers 16 police officers with the Chief of Police of St. Joseph, a sheriff, four deputies, the General Manager and the Superintendent of the road, the local Superintendent of the Adams Express Company and a bogus express messenger. The train was duly stopped about two miles north of St. Joseph by lantern signal; the engineman was covered in the customary way, and five men went to the express car, the door of which was opened, with much alacrity, on their demand. The police officers also opened fire with like alacrity. The result was two dead robbers, three live ones brought back to St. Joseph, and one in the woods, since caught. This appears to be a more efficacious way of investigating this evil than the one proposed by Senator Pepper. We wish to record our admiration of the pluck of General Manager W. C. Brown, Superintendent G. M. Hohl, Engineman Calliotte, who volunteered to act as express messenger, and Adams Express Superintendent Sanford. It was no trifling matter to deliberately take part in an enterprise where bullets and buckshot were sure to fly. The police officers did what they enlisted for, but railroad officers are not paid to risk their lives in that sort of work.

There was an attempted train robbery on the Illinois Central near Centralia, Ill., on the night of Sept. 20, in which one robber was fatally wounded and the two others of the party captured, though unfortunately the engineer, fireman and conductor were also badly hurt. The engineer's injuries were said to be fatal. The train was the southbound New Orleans limited and the robbers got onto the car platform next to the tender when the train stopped at Centralia. The men in the express and baggage cars had a lively battle with the robbers, many shots being exchanged, and would perhaps have been worsted had not a brakeman riding dead-head in one of the passenger cars come to their aid with a shotgun. On the Atchison, Topeka & Santa Fe, in Oklahoma Territory, one night last week, two train robbers adopted the business-like method of intimidating the conductor and going through the cars of a heavily loaded train and collecting the fares. If anyone was inclined to refuse payment of cash, or to ask for change, he was threatened with a pistol. It is said that the robbers were afterward captured with several hundred dollars in their possession. The American Express Co. has paid a reward of \$500 to the brakeman who shot a robber at Centralia, and has divided \$1,000 among the conductor, engineer and fireman. On Sept. 24 a train robber in Texas was sentenced to 25 years imprisonment and an accomplice to five years. They robbed a train near Coleman on the night of May 24.

The fact that foreign railroad men visiting Chicago this year will find the most interesting part of the railroad exhibits outside of Jackson Park has been brought into uncomfortable prominence since Aug. 26 by the unusual number of disastrous collisions and of train robberies. Some of the "object lessons" which European railroad men learn here will not be creditable either to the American public generally or to American railroad managers. Our notions of the proper remedy for train robberies have already been given. The plucky management of the Burlington officers at St. Joseph is hardly to be taken as an example for general emulation, for we cannot as a rule depend upon receiving advance information of intended robberies, although it is true that standing offers of large rewards will have a good tendency in this direction. The fundamental principle, however, of eternal vigilance in hunting down the culprits must be kept always in mind. Where the state or municipality does not act, the burden of responsibility upon the railroads and the express companies is the greater.

The lessons of all the recent collisions are to a considerable degree identical, and where they are not so the de-

tails are but little different from those which have been recently discussed in these columns. Briefly, the Kingsbury accident shows the need of interlocking and distant signals at all stations; the Manteno case illustrates anew the need of the block system, even on a straight and level road; and the lesson at Colehour takes the shape of a demand for the block system on single track, with the corollary, on most roads, of additional telegraph offices, so that all meeting tracks can be made available for all trains, while still retaining the security of telegraph blocking. The details of these collisions are yet to be published. The reports from Kingsbury indicate that perhaps the brakeman turned the switch when the passenger train was close upon him. We must not allow this to argue against the need of a distant signal. The existence of well-designed signals in sufficient number tends strongly to promote correct habits in the men who handle the switches and in the enginemen who have to be guided by the signals. A good distant signal implies a good home signal, which is pretty sure to be better than a common switch target. The Superintendent of the Illinois Central found such conflicting evidence at Manteno that he would express no opinion until he had held a thorough investigation; but the reports indicate that dependence was placed upon a five-minute time interval, and that the stations at which there were agents or operators to maintain this interval were long distances apart. While it is a fact that this system can be used on straight and level roads for many years without its weakness being made prominent by a serious collision, it is to be remembered that this is so only because enginemen working under the system act with constant caution. They see the tail lights of preceding trains and follow them closer than the rules permit, but being wide-awake men they guard against the danger involved in this practice. Depending upon this wide-awakeness of the runners fails at last. Regulating one's speed by a red light from one to five miles ahead involves so many uncertainties that the habit of taking risks grows on a runner insidiously. This brings up again the question of discipline, and makes it pertinent to inquire whether, if the Illinois Central ran trains five minutes apart, or even ten minutes apart, with nothing but the vigilance of the enginemen to protect the trains from collision, the conduct of enginemen was thoroughly and frequently investigated. The Colehour collision is laid wholly at the door of the despatcher, and we have heard that he has a good record of 10 years' standing. It will be of interest to have every detail of this record published. Have the orders issued by this man been regularly examined by a rigid inspector to see that the minutest details were always correct? Has he been officially informed of the lapses which other good dispatchers have fallen into, so that he could appropriate the lessons of their experience? Information of this kind ought to be frequently given—there is enough of it—and when we say "officially" we mean that it ought to be given in clear language, by a recognized superior, and that the recipient should be required to make an acknowledgment.

The fact that two of these recent collisions involved what may be called distinctively World's Fair trains and that the third was on a principal line leading to Chicago can hardly be called unexpected. Predictions that the unusually large travel of this season would be accompanied by disasters were made long ago. In discussing the demands for reduced fares before the opening of the exposition we mentioned the duty of looking out for safety first. We frequently said that this year of all others the railroads should think first of carrying their passengers safely, comfortably and profitably—that reducing fares, increasing speeds and other advertising efforts were particularly out of place in a year of extraordinary travel. The Wabash and Big Four trains would probably not have been running so close together except for the World's Fair travel. It is no defense for the practice which prevailed in these cases that running trains in sections is the only way and the proper way to handle such traffic, for running in sections does not of necessity mean a short time interval. A cautious manager remarked to us the other day that where he could not use the space interval he always endeavored to preserve a time interval of 45 minutes between passenger trains. The term "section" has no peculiar meaning in this connection. Five minutes is a dangerously short interval, whether the two trains be sections of one number or two independent trains. Many of the criticisms in the daily papers express or imply a belief that the reductions of expenses on the railroads which have taken place within the past three months have been pre-disposing causes of the collisions. We doubt very much if this is true. We have not heard that the despatchers on the Pennsylvania or the brakemen on the Big Four or the Wabash had suffered a reduction in pay. Even if they had it is quite unlikely that the diminution of income has as yet affected the spirit of employees hitherto faithful. At all events, this charge should be supported by positive rather than negative evidence if it is to be allowed any weight. It will be of interest to inquire, however, whether the switch-tending at Kingsbury and the train spacing on the Illinois Central would have been entrusted to older or better men if it had not been necessary to make a large number of promotions to pro-

vide for the additional trains required by the World's Fair traffic.

The Louisville & Nashville has secured new men for some of its shops. At Howell, Ind., 600 of the old men returned to work. It appears that at Louisville the police were called upon to protect the premises of the company, and on Tuesday last some switchmen struck for the alleged reason that they had to go to the trouble of presenting passes to the police authorities. Brotherhood men on the Cleveland, Cincinnati, Chicago & St. Louis have been voting for some time on the question whether they would accept a reduction of pay, and their action has been the subject of innumerable newspaper items, mostly predicting that the men would not submit; but at this writing there has been no strike, and the officers of the road say that large numbers of employees have expressed their intention to remain at work. The Chesapeake & Ohio Southwestern has reduced wages 10 per cent. in all departments, to take effect Oct. 1. It is announced from Omaha that the Union Pacific employees have unanimously voted against accepting a reduction in wages; but whether this means that they will strike if the reduction is enforced is not stated. It would be a queer lot of men who should vote in favor of a reduction. The Chicago, Milwaukee & St. Paul has decided not to make the reduction of 10 per cent. of which the men had been advised. It is said that this was done on the agreement of the men to go without pay for overtime until Jan. 1. The general reduction in wages on the Denver & Rio Grande went into effect on Sept. 20. The various brotherhoods that have threatened to strike on that road are waiting for advice from their chiefs.

The Pennsylvania now appears in the unusual rôle of a differential line, the Trunk Line Association having agreed to its demand that Commissioner Goddard be authorized to fix a round trip rate for the day-car excursions to Chicago, which would give the Pennsylvania its share of the business, and Mr. Goddard having decided upon \$18, which is the same as is charged by the Erie. The Pennsylvania has now available a large number of passenger cars that have been used in its seashore business during the summer. At first thought the idea of a differential rate over the Pennsylvania is one calculated to disturb the pride of the Pennsylvania's admirers, but the claim which it is said to have made, that the New York Central, by means of its leased line, the West Shore, was constantly taking passengers at a differential rate, has a good deal of reason in it. The Pennsylvania has already advertised the \$18 rate. According to the schedule heretofore published the day-car excursions over that road will be run on Sept. 28 and Oct. 2, 11, 17 and 21.

NEW PUBLICATIONS.

The Ore Deposits of the United States. By Professor James F. Kemp, A. B., E. M. of Columbia College. Pp. 302; octavo. New York: Scientific Publishing Co. 1893. Price, \$4.

The book is divided into two parts, part I. being given to an introduction to the subject and to the theory of the deposition of metals in veins, ores, etc. Part II. treats of our deposits, including the iron series, copper, lead, zinc, silver, gold, aluminum, antimony, arsenic, bismuth, chromium, manganese, mercury, nickel, cobalt, platinum and tin. These metals are all treated with special reference to their geographical location and the process by which they were deposited or formed, together with a general description of the treatment of the ores to extract the metals. The author has been particular to give references to the literature of each subject, by which he has opened the door to extended and exhaustive study of any particular ore about which the reader may wish to inform himself. The method of numbering the paragraphs is novel. Each paragraph has three numbers; thus 2.03.14 signifies that the paragraph is No. 14, Chapter 3, part 2.

Bolivia. Bulletin No. 55 of the Bureau of American Republics. Washington. 1893.

This is a brief but comprehensive account of one of the South American republics, concerning which very little is known in this country. It is written with restraint, having no flavor of propaganda, and one desiring information about Bolivia will be likely to find here an answer to almost any question that he may ask. The conditions, present and prospective, of transportation are given in great detail, comprising accounts of all railroads, stage lines, mule trails and water routes, including distances, stations, elevations and, in many cases, the time required for transit. The account of the mineral deposits is likewise particularly ample. The work contains also the constitution and mining laws of the republic, the import duties *in extenso*, patent laws, rates of postage and a map.

TRADE CATALOGUES.

The Frost Dry Carburetor System of Car Lighting. The Railway Lighting and Manufacturing Company, Philadelphia, Pa.

This is a 9 $\frac{1}{2}$ x 12 in. catalogue bound in boards and illustrated. The text sets forth the advantages of the system, names the parts and describes the apparatus.

Dredging and Excavating Machinery. Bucyrus Steam Shovel & Dredge Co., South Milwaukee, Wis. This company has issued Parts II. and III. of its new

catalogue, which are given to dredging machinery of the heaviest and most improved design. The book is fully up to the standard of trade publications, and the illustrations are fine. It has little text, the description being confined to giving the capacity, speed, rate of discharge, and dimensions of each machine illustrated. This catalogue, together with Part I, which is devoted to steam shovels, gives a good idea of the most modern means of handling earth and minerals by machinery. The catalogues are standard size, 9 x 12 in.

Rope Transmission. Dodge Manufacturing Co., Mishawaka, Ind.

The subject of rope transmission is treated in a small pamphlet lately issued by the above named firm. The growth of the company's works is traced from the small establishment founded in 1878 to the plant which to-day occupies 60 acres of ground, with a floor space in factories and warehouses of 16 acres. Especial attention is directed to their wood split pulleys, shafting, clutches, and to their system of rope transmission as applied in their own works and elsewhere.

Power Transmission Machinery. Rice Machinery Co., Chicago.

This company issues a well arranged catalogue and price list describing and illustrating a number of shaft couplings, pillow blocks, hangers and clutches, etc., which it makes and controls. Especial attention is given to the subject of power transmission by manilla rope, in which department the company represents the Dodge Manufacturing Co., Mishawaka, Ind. Several pages are devoted to a number of useful rules and tables for the use of those interested.

Machine Tools.—The Niles Tool Works Co., Hamilton, O.

This firm has lately issued a neat catalogue printed in English, German, French and Spanish and calling especial attention to a number of its standard machines of which illustrations are given, each accompanied by a short description. A list is also given of other tools manufactured by the company. The volume is well adapted for World's Fair distribution, for which use it is evidently intended.

TECHNICAL.

Deodorizing Oil Gases.

A deodorizer for the exhaust gases from oil engines which has just been brought out in Paris is based upon the absorbing power of boneblack for certain substances. The boneblack, in fact, is made to exercise a double effect, not only absorbing the ammoniacal and fetid hydrocarbon gases of the products of combustion as exhausted from the engine cylinders, but also retaining offensive particles in a mechanical way. The apparatus, as illustrated and described in a recent issue of the *Revue Industrielle*, consists simply of a box divided into two compartments, one above the other, by a perforated, horizontal partition, on which is spread a layer of the boneblack. The exhaust gases from the engine first enter the lower, empty compartment, then pass through the perforated partition and layer of absorbent into the upper compartment, and from there escape into the open air. A similar device with a vertically placed filtering layer is also shown, the box in this form, however, having three compartments, the middle one containing the boneblack. The principle of operation is the same in both designs.

Life of the "Goliath" Rails.

Concerning the life of Sandberg's "Goliath" rails in Belgium, *Glaser's Annalen* states that the earliest of these rails, which were laid in 1887, were recently examined by Belgian Government engineers. Two hundred of these rails, supplied by the Cockerill company and in service on the Brussels-Antwerp Division, were inspected. The traffic on that line is particularly heavy, notwithstanding which no important defects were found. The amount of wear is said to have, in no case, exceeded one millimeter (0.04 in.). The life of the rails under the conditions ruling there is placed at 100 years.

THE SCRAP HEAP.

Notes.

An electric street car line is proposed between Philadelphia and Lancaster, Pa., and the Pennsylvania Railroad has entered proceedings in the courts in all the counties along the line to stop the project.

The Lehigh Valley has discharged 70 freight brakemen on the Easton & Amboy and Lehigh Valley divisions, reducing the number of brakemen in each crew from four to three.

A man giving his name as Henry R. Williams, having an office in New York City, has engaged several hundred machinists, boiler-makers, carpenters and blacksmiths to be in readiness to go to work on "a railroad out of New York."

The State's Attorney of Dearborn County, Ind., has begun suit to annul the charter of the Ohio & Mississippi Railroad because the road fosters prize fights in the county, especially at Lawrenceburg, by bringing the promoters and spectators of the fights from Cincinnati.

The St. Louis, Iron Mountain & Southern has discovered a considerable number of counterfeiters of its skeleton tickets, form G. T. O., printed on green paper. The fraud must have been committed some time ago, as

the discovery has just been made through the collections of foreign roads.

Nine gatemen and guards of the Chicago & South Side Rapid Transit (elevated) Road have been arrested for defrauding the company, and held in \$1,200 bail each. The men are charged with embezzling tickets. It is said that more than 20 other persons are implicated, and that they have stolen large sums.

Spanish-American Notes.

The Panama Railroad Co. has decided upon a reduction of 10 per cent. on all salaries to employees of high and low degree, without discrimination.

The Nicaraguan Government has entered into a contract with private parties for the construction of a pier at Corinto, to be completed by Oct. 13, 1894. The authorized charges are, however, excessive, being \$1 for every ton of merchandise, 25 cents for each parcel of baggage and 25 cents for each passenger landed upon it.

A new steamer has just been finished by Messrs. Murdoch & Murray, at Glasgow, for the Amazon River traffic. It is 140 ft. long, 24 ft. beam and 16 ft. deep. The whole of the main deck is fitted with cattle stalls. The cabins are on the promenade deck, affording accommodations for 36 passengers. Power is furnished by two sets of triple expansion engines.

It has finally been acknowledged by the Peruvian Government that the imposition of a fine of \$5,000 upon the Peruvian Corporation, Ltd., for its failure to complete the Lima & Oroya Railroad within the prescribed time was an error. The delay was due to unavoidable accidents, but the line is now in operation, and the contract is interpreted by the government in the light of its spirit rather than its letter.

South American Notes.

Manufacturing is making important strides in Rio Grande do Sul, Brazil, according to recent reports. One cotton and woolen factory has just declared a dividend of 17 per cent. A candle and soap factory has doubled its plant, finding a growing demand from all parts of Brazil for its products. In addition there are factories for combs and buttons, silk and cotton underwear, leather goods and cigars. We lately called attention to the large increase of traffic on the railroads of this prosperous state.

Wood-Cutting Tools for British Honduras.

Sir C. Alfred Moloney (Governor of British Honduras) has sent to the London Chamber of Commerce a collection of samples of wood-cutting tools, in the hope that the attention of manufacturers may be directed to the competition in such goods which has now sprung up between the United States and this country for the supply of these implements, in which competition we are being successfully rivaled by the United States. He suggests that it might be possible for English manufacturers to turn out as serviceable an article as the United States and at the same cost.—*Times (London)*.

A Few Law Suits.

The report to the Northern Pacific Receivers of the general counsel, Mr. James McNaught, shows that there were pending when the Receivers were appointed 850 law suits in the superior courts of record and 2,059 in the Interior Department and before the local land offices along the line of the road. For two years ending June 30, 1893, the total number of cases disposed of was 1,895. Of these 1,139 were cases in the Interior Department and local land offices, of which 685 were won by the company and 454 lost. The balance, 765, were in state and federal courts of record, of which 449 were tried, and of these 357 were won by the company and 92 lost. Of the balance, 134 were settled and 182 dismissed without cost to the company.

Lehigh Valley Coal Traffic.

The independent coal shippers along the line of the Lehigh Valley Railroad have succeeded in making a contract with the road for the disposal of their coal, for a year, in practically the same terms that have been in force since the Philadelphia & Reading began to operate the Lehigh Valley. From Oct. 1, 1893, to Oct. 1, 1894, the Lehigh Valley Coal Company will purchase the coal mined by the individual operators at a fixed price upon a basis of 60 per cent. of the price of coal at tide-water, the coal to be paid for in cash on the 15th of every month. All the coal purchased by the Lehigh Valley Coal Company is to be turned over to commission men selected by the company, and to be sold by them at a commission of 15 cents a ton. The amount of coal involved is from 2,500,000 to 3,000,000 tons per year.

The Train Robbing Industry.

On the Michigan Central trainmen on trains hauling express and mail cars will be armed with revolvers and repeating rifles. On the Pennsylvania lines entering Chicago the trainmen will be provided with Winchester repeating shotguns. It is believed that other roads will at once take the same precautions to protect their trains.

A Tennessee inventor has devised a scheme for electrifying a safe and also the car seats, using a dynamo in the car for the purpose. "The safe will be large enough to hold a man, will be of steel, lined with rubber, with a perforated bottom. When a messenger is threatened he steps into the safe, turns on the electric current, and when the robber touches the safe the electricity does the rest." At least the newspapers say that all this is to be done. The only similar contrivance that we remember is Professor Garner's electric cage for African travel.

Railroad Development in Tunis.

The long-looked-for development of the railroad system in Tunis is likely soon to become an accomplished fact. The agreement between the French and Tunisian governments and the Bône-Guelma company awaits only formal ratification. The Bône-Guelma company, who have held a Beylical concession since 1880 for the construction of the Medjerda Railroad and its branch lines, concluded on Oct. 12, 1892, an agreement with the Tunisian Government, subject to the approval of the French Government, for the construction in the regency of 350 kilometers in length with a gauge of one meter. The cost of these railroads has been estimated at about \$10,400 per kilometer, with the exception of the Zaghouan-Susa line, valued at \$9,000 per kilometer. The agreement stipulates that the railroads shall be constructed with the capital of the Tunisian Government, the company undertaking to make any necessary advances of sums which the Government may be unable to provide during the first years of the undertaking. The projected lines are: 1. Tunis to Susa, via Zaghouan, Bouficha and Enfidaville, with a branch line through the Fehs Plain. 2. Susa to Kairwan, starting from a junction on the above-mentioned line at Kalaa Kebira and passing by Kroussiah and the camp of Sidi-el-Hani. 3. Susa to Moknine, via Msaken, with event

ual prolongation to Sfax. 4. Branch line on the Tunis-Susa Railroad to Naboul, passing by Mornag, Khanouet, Grombalia and Hammamet. 5. Prolongation of the Tunis-Hammamet-el-lif line to Menzel-Bou-Zelfa, and passing by Fondouk, Djedid and Soliman with eventual prolongation to Kelibia (Galipia). The capital of the first two railways has been estimated at 10,984,580 fr., equivalent to about \$2,197,000, in which sum is included the conversion of the Tunis-Hammamet-el-lif line from broad to narrow gauge. The railroad which is to connect Bizerta with Tunis by a branch from the station of Djedida, on the Medjerda main line, is already in course of construction, and the works are being actively pushed forward by "La Société des Batignolles" in behalf of the Bône-Guelma Railway Company, who have agreed to complete the railroad in the space of two years at a cost of \$1,120,000.—*Transport (London)*.

LOCOMOTIVE BUILDING.

The Boston & Maine has ordered eight engines from the Rhode Island Locomotive Works, Providence, R. I.

CAR BUILDING.

The Florida Central has given an order for 300 cars to the Mount Vernon Car Manufacturing Co., of Mount Vernon, Ill.

The Northwestern Dispatch Co., "Lackawanna Line," has let a contract for 250 freight cars to the Northwestern Machine & Car Co., of Oshkosh, Wis.

The Ottawa, Arnprior & Parry Sound road has just received two first-class and two second-class passenger cars and 100 platform cars from the Crossen Car Company, of Coburg, Ont.

BRIDGE BUILDING.

Bradford, Pa.—The city is to build an iron bridge 60 ft. long with a 16-ft. roadway and two sidewalks each 6 ft. wide. The City Engineer is F. W. Dalrymple.

Buffalo, N. Y.—The Hilton Bridge Co., of Albany, has been awarded a contract, by the State Department of Public Works, to build four bridges over the canal at Buffalo, the contract price for the whole being \$15,725.

Charlestown, W. Va.—Proposals are being received by City Engineer J. B. McElroy for the erection of two bridges in Charlestown, one to be a steel or iron bridge, 30-ft. span, 26 ft. wide, over the tracks of the Baltimore & Ohio Railroad at Charles street, and the other a steel or iron bridge, 20-ft. span, and 66 ft. wide, over Evitt's Run at West Washington street.

Columbus, O.—The contract for the construction of the East Broad street bridge over Alum Creek has finally been awarded to the Penn Bridge Co., of Pittsburgh, at its bid of \$23,350. Work cannot begin for some weeks, as the bonds are not yet sold.

Cumberland Bay, N. B.—The new bridge is completed, and accepted by the Department of Public Works. The contractors, J. A. Killam & Co., have moved their men and plant to the Tantramar Bridge, at Sackville, for which they have the contract.

Gatineau Point, Que.—Bids for the bridge across the Gatineau River have been opened. Viau & Lachance were awarded the contract for the roadway approach piers and abutments at \$15,079 and the Dominion Bridge Company for the superstructure at \$13,900. It is understood the work will begin at once.

Haugen, Wis.—The Lassig Bridge & Iron Co. has begun the erection of a 114-ft. steel span over Bear Creek for the Chicago, St. Paul, Minneapolis & Omaha Railroad.

Hintonburgh, Ont.—Mr. F. W. Harmer, Municipal Clerk, is receiving bids for the construction of an iron bridge over Blair's Creek.

Hull, Que.—The question of building a bridge across the Gatineau River near Wakefield will be discussed at a meeting of the Ottawa County Council to be held this week.

London, Ont.—The joint report of Engineer Jennings, on behalf of the city, and Chief Engineer Hobson, of the Grand Trunk Railway, places the estimated cost of putting the London & Port Stanley Railroad into proper condition at \$127,000. This includes new iron bridges over Mill and Kettle creeks, the raising of the Port Stanley Bridge, and repairs to culverts.

Norwood, Man.—W. G. Reid, contractor for the Norwood Bridge, reports that by Nov. 1 the bridge will be ready for use. Mr. Reid has newly ended his work for this season on the Canadian Pacific, east of Rat Portage. He has built eight bridges, ranging from 250 to 400 ft. in length.

Peterborough, Ont.—The contract for constructing a new bridge over the Otonabee River at Smith street has been awarded to Mr. Chas. Wynne.

Petersburgh, Va.—The city is to build a bridge 90 ft. long, of steel and iron.

Richmond, Tex.—The selection of a site for the proposed bridge across the Brazos has been characterized by a good deal of contention, and all the bids that were submitted have been rejected. More than 20 bids were submitted, ranging from \$19,400 to \$38,750. The Commissioners' court has readjusted for bids for the erection of the bridge at the Morton street site; the previous proposals included both Morton Street and the ferry site.

Sarnia, Ont.—The contract for building the new Caughlin bridge in Elgin County has been awarded to Mr. Laing Anderson.

Scranton, Pa.—Bids have been opened for the construction of the iron bridge on Parker street from the following: Oswego Bridge Co.; Toledo Bridge Co.; W. H. Shepard & Sons Co.; Canton Bridge Co.; Horseheads Bridge Co.; Wrought Iron Bridge Co.; Canton; Berlin Iron Bridge Co.; Sam. D. Palmer & Co.; Nelson Buchanan; King Bridge Co.; Groton Bridge Co.; Massillon Bridge Co.; Buffalo Bridge Iron Works (\$4,995); Penn Bridge Co. (\$3,600). The last two were the highest and lowest. At the next meeting of councils a report will be submitted recommending the preparation of plans and an estimate of the cost of erecting a long iron bridge from the easterly end of the Sweetland street bridge to the foot of Linden street.

Plans have been prepared for a bridge over the Delaware, Lackawanna & Western tracks on West Lackawanna avenue. A bridge at this point would cost probably \$40,000.

Toledo, O.—A bridge is to be built over the Miami & Erie Canal at Western avenue of stone or wooden substructure and iron superstructure. The contract is to be let Oct. 9.

Welland, Ont.—Bids are being received by Mr. M. B. Barnard, Chairman Road and Bridge Committee, for building the White Pigeon Bridge.

Wheeling, W. Va.—The County Commissioners of Ohio County, West Virginia, have contracted with the Wrought Iron Bridge Company of Canton, O., for the erection of a steel bridge over Wheeling Creek at Rooney's Point, in that county. The bridge is to be 16 ft. wide and 80 ft. long.

Zanesville, O.—The County Commissioners have awarded the Dresden bridge contract to the Smith Bridge Co., at their bid of \$800 for the substructure and \$3,500 for the superstructure.

RAILROAD LAW—NOTES OF DECISIONS.

Powers, Liabilities and Regulation of Railroads.

In Indiana it is held that taxation of the property of a corporation engaged in interstate commerce is not taking interstate commerce.¹

The Supreme Court of North Carolina decides that where the law establishing a railroad commission provides for the service of notices, the attendance of witnesses, the punishment of contempts, the rules of evidence and appeals from decisions, a claim properly presented is not to be denied because the particular form of the complaint or the manner in which the proceeding is to be entitled or some other immaterial matter of detail, is not particularly prescribed, since the commission has the inherent power of every court of record to make rules necessary to the exercise of the powers conferred upon it.²

A Massachusetts statute authorizes a railroad corporation to relocate its passenger stations with the approval of the Board of Railroad Commissioners and the city council of the city or selectmen of the town in which the station is situated. Section 156 prohibits the abandonment of a passenger station which has been maintained for five consecutive years. The Supreme Court holds that the relocation and consolidation of two stations at one point in one proceeding is not an abandonment of a station, within the inhibition of section 156.³

In the Federal Court it is ruled that the fact that legal services rendered to a railroad company resulted in benefit to its bondholders does not displace the lien of the latter, who were not parties to the contract of employment, in favor of a claim for such services, and that a claim for legal services rendered in maintaining the validity of municipal aid bonds, two years before the appointment of a receiver, does not take precedence of a railroad company's mortgage bonds.⁴

Injuries to Passengers, Employees and Strangers.

The Supreme Court of Virginia rules that it is the lawful right of every citizen *prima facie* to become a passenger on a railroad train, and neither the purchase of a ticket nor the entry into the car is essential to create the relation of carrier and passenger, and where a person enters the ticket office to buy a ticket he is entitled to the protection of a passenger, even though the agent refused to sell him a ticket.⁵

In Indiana a passenger, on arrival at his destination, asked for his trunk, and was informed that it would come on the following train. At the time designated the passenger's drayman demanded the trunk and was told the train was an hour late. Within the hour the drayman again started to the depot and met the company's agent on the way, who said the trunk had arrived and was locked up in the depot and refused to return and get it. Twenty minutes later the drayman called at the depot for the trunk but could not get it. About 20 minutes after the arrival of the trunk at the depot it was placed in a warehouse by the agent and locked up for the night. The Supreme Court rules that where the trunk was destroyed during the night by fire the company's responsibility as a common carrier was not terminated, and it was liable.⁶

The Supreme Court of California holds that under a statute providing that a "common carrier may demand the fare of passengers either at starting or at any subsequent time," a rule of a street car company requiring passengers to deposit their fare on entering the car is reasonable.⁷

In Alabama the Supreme Court rules that where plaintiff left his place on the car where it was customary for persons having passes to ride, and, at the request of the fireman, stepped on the engine, and was at work cleaning the headlight when the injury was received, it was for the jury to say whether plaintiff's negligence proximately contributed to his injury, and whether, if it did, his negligence was overcome by the wanton negligence of defendant's servants; and a charge which ignores the inquiry whether plaintiff's contributory negligence was overcome was properly refused.⁸

The Supreme Court of Indiana holds that where a passenger purchased a ticket for a certain train and had his trunk checked 20 minutes before train time, it was the duty of the road to carry the trunk on the same train with its owner, and a failure to do so was negligence.⁹

In Oregon the Supreme Court rules that where a track walker of defendant railroad, while crossing its bridge, saw an approaching engine a half mile away, and, thinking he could get across, started to run, and fell and hurt his leg, and then stepped on one of the bridge caps placed along the bridge for that purpose, where he remained in safety, and he had ample time after sighting the train to retreat or step on a cap, where plaintiff was an adult of ordinary intelligence, without any previous experience in track walking, but lived near the railroad, and had been over the section on which he worked several times, and knew the bridges on it, and the projecting caps were at frequent intervals on such bridges, and furnished conspicuous places of safety against passing trains, defendant had a right to assume that plaintiff would avoid the risk incident to his employment, and was not liable for a failure to specially instruct plaintiff to resort to the caps when caught on the bridge by an approaching train.¹⁰

The Supreme Court of Missouri holds that a railroad is liable for the death of a switchman killed in the performance of his duty while attempting to get on the footboard of a slowly moving locomotive if the company knew, or by the exercise of ordinary care might have known, that the footboard which it had provided deceased to ride on was defective or unsafe by reason of its slanting condition.¹¹

In Massachusetts it is laid down that where, during several years of plaintiff's employment as a brakeman with defendant, defendant had maintained in the same condition an awning at its station for the protec-

tion of passengers from the rain, the existence of such awning, by striking which plaintiff was injured, is not a "defect," within the meaning of the statute making employers liable for injuries to their employees by reason of any "defect" in the condition of the ways of the employers' business, due to the negligence of the employers.¹²

In Texas the Supreme Court holds that a person rightfully traveling on a hand-car, as the servant of a contractor, is not bound to use "the highest degree of care" for his safety, to avoid collision with the railroad company's trains, but such care only as an ordinarily prudent person would exercise.¹³

In Tennessee in an action by a brakeman against a railroad company to recover damages for personal injuries caused by a defective "hand hold" or "foot rest," there was evidence that at the moment plaintiff put his foot on the foot rest, to ascend to the top of the car, there was a sudden jamming of the cars together, and that the injury was caused by the concurrent negligence of the engineer and of the company, through the defective foot rest. The Supreme Court rules that defendant was not absolved from liability because the engineer and plaintiff were fellow servants, and defendant was not liable to plaintiff for the former's negligence.¹⁴

In Massachusetts while a section hand was turning the crank used to propel a hand car his clothing was caught by the end of the crank and he was thrown off. The crank that caused the injury had a threaded screw bolt, which passed through a wooden handle and projected an inch beyond a nut at the end of the handle. The Supreme Court decides where there was no evidence that the crank complained of was not a well-known device, that the fact that it was more dangerous than other cranks in use, which had the end of the bolt welded, did not render the employer liable.¹⁵

Whether a traveler who stops and looks across before attempting to cross does so at a place where he can best see an approaching train is for the jury, says the Supreme Court of Pennsylvania.¹⁶

In Texas, just as a wagon got over a railroad track at a crossing, a horse, which deceased was leading from the rear end of the wagon, became frightened at the approach of a hand car and pulled back, throwing deceased on the track in front of the car, which struck him. The Supreme Court holds that, if there was reasonable time, under ordinary circumstances, to cross the track in safety ahead of the hand car, the driver was not chargeable with negligence for failing to anticipate an unusual occurrence, such as the horse's pulling deceased out of the wagon, unless there was reason to anticipate such occurrence from the surrounding circumstances.¹⁷

- ¹ C. C. & St. L. Ry. Co. v. Backus, 33 N. E. Rep., 421.
- ² Atlantic Exp. Co. v. W. & W. R. Co., 16 S. E. Rep., 393.
- ³ Cunningham v. Railroad Com'rs, 32 N. E. Rep., 959.
- ⁴ Finance Co. v. C. & C., 52 Fed. Rep., 678.
- ⁵ N. & W. v. Gallier, 16 S. E. Rep., 915.
- ⁶ Toledo, St. L. & K. C. v. Taylor, 33 N. E. Rep., 462.
- ⁷ Nye v. M. & Y. St. R. Co., 32 Pac. Rep., 530.
- ⁸ Brown v. Seaboard, 12 South. Rep., 289.
- ⁹ T. St. L. & K. C. R. Co. v. Tapp, 33 N. E. Rep., 462.
- ¹⁰ Gibson v. O. S. L. & N. R. Co., 32 Pac. Rep., 295.
- ¹¹ O'Melia v. K. C. St. J. & C. B., 21 S. W. Rep., 503.
- ¹² Pisk v. Fitchburg, 33 N. E. Rep., 510.
- ¹³ Cartier v. G. H. & S. A., 21 S. W. Rep., 631.
- ¹⁴ L. & N. v. Kenley, 21 S. W. Rep., 328.
- ¹⁵ Carey v. Bos. & M., 33 N. E. Rep., 512.
- ¹⁶ McGill v. Pittsburgh & W. Ry. Co., 25 A. W. Rep., 510.
- ¹⁷ Johnson v. C. & S. F., 21 S. W. Rep., 274.

MEETINGS AND ANNOUNCEMENTS.

Dividends:

Dividends on the capital stocks of railroad companies have been declared as follows:

- Boston & Maine*, quarterly, 2 per cent., payable Nov. 15.
- Chartiers*, semi-annual, 2½ per cent., payable Oct. 2.
- Norfolk & Southern*, quarterly, 1 per cent., payable Oct. 10.
- Sunbury & Lewiston*, semi-annual, 4 per cent., payable Oct. 2.

Stockholders' Meetings.

Meetings of the stockholders of railroad companies will be held as follows:

- Alabama Great Southern*, annual, Birmingham, Ala., Oct. 18.
- Atchison, Topeka & Santa Fe*, annual, Topeka, Kan., Oct. 28.
- Cleveland, Cincinnati, Chicago & St. Louis*, annual, Cincinnati, O., Oct. 25.
- Concord & Montreal*, annual, Concord, N. H., Oct. 10.
- Cumberland Valley*, annual, Harrisburg, Pa., Oct. 2.
- Denver & Rio Grande*, annual, Denver, Col., Oct. 17.
- Evansville & Terre Haute*, annual, Evansville, Ind., Oct. 16.
- Illinois Central*, annual, Chicago, Oct. 18.
- Lake Erie & Western*, annual, Peoria, Ill., Oct. 4.
- Louisville & Nashville*, annual, Louisville, Ky., Oct. 4.
- Manhattan Elevated*, annual, New York City, Nov. 8.
- New York, New Haven & Hartford*, annual, New Haven, Conn., Oct. 18.
- Northern Pacific*, annual, Mills Building, New York City, Oct. 19.
- Peoria, Decatur & Evansville*, annual, Peoria, Ill., Oct. 3.
- Pullman's Palace Car Co.*, annual, Chicago, Oct. 19.
- St. Louis & San Francisco*, annual, St. Louis, Mo., Oct. 24.
- St. Louis Southwestern*, annual, St. Louis, Mo., Oct. 3.
- St. Paul & Duluth*, annual, St. Paul, Minn., Oct. 12.
- Spokane Falls & Northern*, annual, Spokane, Wash., Nov. 13.
- Toronto Belt*, annual, Toronto, Canada, Oct. 3.

Technical Meetings.

Meetings and conventions of railroad associations and technical societies will be held as follows:

- The American Association of Railroad Superintendents* will hold its next meeting at the Grand Pacific Hotel, Chicago, Thursday, Oct. 12.
- The Western Railway Club* meets in room 730, The Rookery Building, Chicago, on the third Tuesday in each month, at 2 p. m.
- The New York Railroad Club* meets at the rooms of the American Society of Mechanical Engineers, 12 West Thirty-first street, New York City, on the third Thursday in each month, at 7:30 p. m.
- The Northwest Railroad Club* meets at the Ryan Hotel, St. Paul, on the second Tuesday of each month, except June, July and August, at 8 p. m.
- The American Society of Civil Engineers* meets at the House of the Society, 127 East Twenty-third street, New York, on the first and third Wednesdays in each month.

International Association of Railroad Superintendents of Bridges and Buildings.

The third annual meeting of this Association will be held at the Continental Hotel, Philadelphia, Pa., Oct. 17, 18 and 19.

Order of Train Dispatchers.

This organization, a rival of the "Train Dispatchers' Association," held its annual meeting in Chicago last week and elected the following officers: Chief Dispatcher, W. W. Olcott; Secretary, O. L. Gurley, Little Rock, Ark. Next year's meeting will be held at Colorado Springs, Col.

American Railway Association.

The fall meeting of this association will be held at the Grand Pacific Hotel, Chicago, on Wednesday, Oct. 11. Reports will be presented by the Executive Committee, Committee on Train Rules, Committee on Car Service, Committee on Safety Appliances and the Joint Committee on Interlocking and Block Signals. Three members of the Committee on Car Service and three members of the Committee on Safety Appliances are to be elected.

American Society of Railroad Superintendents.

Secretary C. A. Hammond announces that the twenty-third meeting of the Society will be held at the Grand Pacific Hotel, Chicago, on Thursday, Oct. 12, 1893, at 10:30 a. m. The principal items in the order of business are: Election of new members; report of Executive Committee; reception of delegates from the Master Mechanics', Master Car Builders' and Roadmasters' associations; election of President, Vice-Presidents and two members of the Executive Committee. Reports of standing committees: (a) On roadway (J. B. Morford); (b) on machinery (J. F. Divine); (c) on transportation (F. K. Huger); (d) on signaling (J. J. Turner).

Papers are to be read: (a) On telegraphy and telephone service as related to the operating department of railroads, by H. F. Royce; (b) on signal appliances, by W. L. Derr; (c) on the Hobbs Island transfer, by G. D. Hicks; (d) on certain common factors of railroad accidents, by C. A. Hammond. Other prescribed topics for discussion are: (a) Catechism for employees; (b) improvements in freight train service; (c) in what ways can maintenance and operating expenses be decreased with regard to true economy? (d) how can a greater efficiency and loyalty on the part of employees be secured?

Boston Society of Civil Engineers.

This society began its autumn meetings the 20th with a trip down the harbor in the afternoon, followed by a dinner at the Quincy House at 6 o'clock. The object of the trip was to study the outfall sewer of the metropolitan system, now under construction at the extreme end of Deer Island.

At the evening meeting a brief account of the recent bridge accident at Chester was given by George S. Rice, one of the engineers employed to inspect the wreck.

The topic for the evening's discussion was, "The Construction of Reservoir Embankments." President J. R. Freeman opened it by a description, illustrated by a diagram on the blackboard, of the dam at Portland which recently gave way. He told what was brought out in the testimony with reference to the construction of the dam, and gave his own suggestions as to what was the cause of its collapse. Clemens Herschel sent a letter giving his views upon the general topic of the evening, which was read by Secretary Tinkham. Mr. Fteley also sent a communication on the same subject. Messrs. E. F. Smith, Tidd, Fitzgerald and others joined in the discussion.

Western Railway Club.

The first monthly meeting of the Western Railway Club for the year 1893-4 was held on Tuesday, Sept. 19, at 2 o'clock, in the rooms of the Central Traffic Association in the Monadnock Building.

The first subject taken up was that of interchange of cars in Chicago. The operation of an interchange agreement in use for the past two years by a number of roads entering Chicago was discussed at some length, and steps taken to make its use more general.

A paper was read by Mr. E. M. Herr on "The Locomotives at the World's Fair," in which attention was called to the noteworthy features of construction embodied in the various locomotives exhibited.

The result of the election of officers for the ensuing year was: President, Wm. Forsyth, C. B. & Q.; First Vice-President, Geo. Gibbs, C. M. & St. P.; Second Vice-President, G. L. Potter, P. F. W. & C.; Secretary and Treasurer, Clement F. Street; member of Executive Committee, P. H. Peck, Belt Railway of Chicago.

The first annual banquet of the Club was held in the evening of the same day at the Grand Pacific Hotel. There were present a number of visiting engineers from the United States and foreign countries who in various ways contributed to the enjoyment of the evening.

Engineering Association of the South.

At the meeting in Nashville, Tenn., Sept. 14, Mr. W. G. Williamson discussed the relations of the City council, the board of public works and the city engineer. He concluded that in small cities the existence of both the council and the board causes needless complications, though in large cities the great amount of public work makes the board more efficient than a committee from the council; that the engineer should be appointed by the board, but should not be embarrassed by their appointing any of his assistants; that orders to the engineer should come from but one source, and, if these orders are contrary to the engineer's judgment, he should be allowed to put his objections on record; and that it is not good economy to bind an engineer to let work to the lowest bidder.

The paper of Mr. Walter G. Kirkpatrick described "A Triangulation System for River Surveying." The field work consists of reading four angles at each of a series of stations along one bank of the river, the distances between the first two stations and that between the last two being measured with a tape. The computation is simple, a connected series of sine proportions, so that the addition of logarithms is cumulative, each addition evolving the length of a line in the system. The plating is by chords, affording a good check against errors. The system, though accurate, requires but little more work than the ordinary transit and stadia survey; the computation can be framed from the field notes, then all the logarithms taken from a table, then all the additions made, evolving all the necessary distances, with which the plating proceeds in a connected chain.

Mr. J. S. Walker discussed the roof-trusses of the World's Fair buildings. Mr. Hunter McDonald outlined the methods and progress in sinking caissons 40 ft. under water for the foundations of the Johnsonville bridge, now being constructed across the Tennessee River for the Nashville, Chattanooga & St. Louis Railway. The Association will meet next on Oct. 12.

PERSONAL.

—Mr. William D. Lewis, Treasurer of the Schenectady Locomotive Works, has been chosen Vice-President. He will continue to act as Treasurer also. Mr. A. P. Strong is Secretary.

—Mr. Jacob Greenwald, Superintendent of Machinery of the State Railroads of Norway, is now visiting this country. He informs a Pittsburgh reporter that he brings an order to the Baldwin Locomotive Works, Philadelphia, for six locomotives.

—Mr. John Robinson, Master Mechanic of the Lake Shore & Michigan Southern at Buffalo, died in that city on Sept. 19. Mr. Robinson was an Englishman, having served on the London & Southwestern from 1857 to 1861. He came to the Great Western of Canada in 1862, and has been with the Lake Shore since 1868.

—Mr. A. G. Wells, lately with the Cleveland, Cincinnati, Chicago & St. Louis, has been appointed Assistant to the First Vice-President of the Atchison, Topeka & Santa Fe, taking the place of Mr. H. C. Ives, who was killed on the Boston & Albany Railroad Aug. 31. Mr. Wells has been connected with the Atchison before.

—Mr. John E. Burrill, a prominent lawyer of New York City, died at Lenox, Mass., on Sept. 23, at the age of 71. He was legal adviser of Commodore Vanderbilt for many years and up to the time of the Commodore's death, and was a director in the New York & Harlem, the Lake Shore & Michigan Southern and other Vanderbilt roads.

—Mr. William H. Wilson, President of the Philadelphia & Erie, who has held that office for nine years, has resigned on account of the infirmities of age. He is 82 years old. Mr. Wilson retains his place in the Board of Directors and will be succeeded in the presidency by Mr. N. Parker Shortridge, of Philadelphia, long connected with Pennsylvania interests.

—Mr. Theodore Nickerson, Purchasing Agent of the Mexican Central at Boston, has resigned and will be succeeded on Oct. 1, by Mr. E. W. Baker. Mr. Nickerson became a director of the Mexican Central as long ago as 1880, and was Assistant to the President for four years. He has been General Purchasing Agent since 1888. He resigns to attend to his personal interests.

—Mr. Thomas Colden Ruggles, a civil engineer of considerable note, died at Yonkers, N. Y., Sept. 22, at the age of 79. He was in early days connected with the Erie and New York & Harlem railroads. Just before the war he was Chief Engineer of the Virginia Central Railroad. During the rebellion he was a major in the engineer corps, and his chief work of note was the construction of the fortification between Covington and Cincinnati.

—Mr. Lewis Williams, General Superintendent of the New York, Chicago & St. Louis, has resigned, to take effect Oct. 1. Mr. Williams has held this office since 1882 and retires on account of ill health. Mr. A. W. Johnston, Superintendent of the Eastern Division of the road, will be promoted to be General Superintendent, and Mr. W. L. Blair, for several years Secretary in the General Superintendent's office, will become Division Superintendent on the Eastern Division.

—Mr. Thomas William Kennard, C. E., an English engineer, died recently at the age of 68. Mr. Kennard was chiefly known in England as the founder of the Monmouthshire Crumlin Works, in 1854, and the designer and constructor of the Crumlin Viaduct. This work spans the Crumlin Valley, connecting the counties of Monmouthshire and Glamorganshire. Its length is over 1,658 ft., and the height is 200 ft. It was opened to the public in 1857. Another of his works was the Atlantic & Great Western Railway, in this country, of which he was the Engineer-in-Chief. He had also, in connection with the Marquis of Salamanca, designed and constructed a number of viaducts and bridges in Spain and Italy.

ELECTIONS AND APPOINTMENTS.

Chesapeake & Ohio Southwestern.—R. Morgan has been appointed Assistant Superintendent at Paducah, Ky. He will assume the duties hitherto performed by Mr. W. J. McGee, who has resigned.

Chicago, Milwaukee & St. Paul.—The annual meeting was held in Milwaukee, Wis., Sept. 20 and the following directors were re-elected: Philip D. Armour, Roswell Miller, Chicago; August Belmont, Frank S. Bond, Charles D. Dickey, Jr., Peter Geddes, James M. McKinlay, Joseph Milbank, William Rockefeller, Samuel Spencer, Alfred Van Santvoord, J. Hood Wright, New York City, and Frederick Layton, Milwaukee, Wis. The officers re-elected were: Roswell Miller, President, Chicago; Frank S. Bond, Vice-President, New York City; E. P. Ripley, Third Vice-President, Chicago; P. M. Myers, Secretary, Milwaukee, and F. G. Ranney, Treasurer, Chicago.

Connecticut River.—At the annual meeting in Springfield, Mass., Sept. 20, the following directors were chosen: John Mulligan, Springfield; Oscar Edwards, Northampton; N. W. Whiting, Holyoke; J. H. Albin, Concord, N. H.; J. H. Williams, Belknap Falls, Vt.; G. H. Ball, Boston; P. C. Cheney, Manchester, N. H.; S. M. Richards, Newport, N. H.; J. W. Stevens, Greenfield, Mass.; E. P. Kendrick, Springfield. The last four are new members, succeeding J. A. Rumrill, Frederick Harris, C. S. Sargent and E. F. Lane. The road is leased to the Boston & Maine.

Edinboro & Erie.—The officers of this new company are: President, G. E. Ryckman, Brocton, N. Y.; Directors, E. H. Fay, Portland, N. Y.; G. W. Fuller, Portland, N. Y.; Charles S. Curcie, Rochester, N. Y., and H. P. Van Dusen, New York City.

Jacksonville Southeastern.—C. H. Bosworth, who has been appointed Receiver of this road, took possession on Sept. 22, and appointed D. Hinchille Auditor and Treasurer and F. L. Thompson Superintendent. No other changes in the personnel are contemplated.

Louisville, New Albany & Chicago.—At the annual election held in Indianapolis last week, three of the directors retired under the by-laws and Messrs. James E. Grannis, W. E. Connor and Joseph H. Bond were chosen to fill the vacancies. Mr. Grannis succeeds himself and the other two take the places of Messrs. N. Willis Bumstead and E. D. Hawkins.

Mexican Central.—E. W. Baker has been appointed Purchasing Agent, with headquarters at Boston, in place of Theodore Nickerson, resigned.

Missouri Pacific.—James W. Dalbey, Superintendent of the Kansas City terminals, with headquarters at Kansas City, Mo., has resigned, and the jurisdiction of M. Stillwell, Division Superintendent of the Eastern

Division, with headquarters at Sedalia, Mo., has been extended to include the Kansas City terminals.

Norfolk, Albemarle & Atlantic.—B. P. Holland, Acting Superintendent, has been appointed Receiver, in place of G. S. Jones.

Old Colony.—At the annual meeting held in Boston, Mass., Sept. 26, the following directors were re-elected: Charles F. Choate, Southboro, Mass.; Thomas J. Borden, Fall River, Mass.; Thomas Dunn, Newport, R. I.; George A. Gardner, James R. Kendrick, Joshua M. Sears, Boston, Mass.; Charles L. Lovering, Taunton, Mass.; John J. Russell, Plymouth, Mass.; Nathaniel Thayer, Lancaster, Mass.; Charles P. Clark, President of the New York, New Haven & Hartford, was elected to fill the vacancy caused by the death of Frederick L. Ames. The vacancies caused by the deaths of Abbot Lawrence and William J. Rotch were left unfilled.

Benjamin B. Torrey has been appointed Treasurer, to succeed John W. Washburn.

Old Colony Steamboat Co.—Austin W. Adams has been appointed Treasurer of this company.

Philadelphia & Erie.—N. Parker Shortridge, of Philadelphia, has been elected President in place of W. H. Wilson, resigned.

Southern Pacific.—E. M. Luckett has been appointed Master Mechanic of the Salt Lake Division with headquarters at Terrace, Utah.

Wisconsin Central.—President E. H. Abbott announces that the road having been delivered over by the Northern Pacific, the company will resume the operation of it at once. The headquarters will be at Milwaukee, and Henry W. Whitcomb has been appointed General Manager. The financial and accounting departments in Milwaukee will be in charge of Vice-President Frederick Abbott.

Wyoming & Utah.—The officers of the company are now as follows: James L. Chapman, President, Fitchburg, Mass.; Charles A. Sherman, Vice-President, Alameda, Wyo.; Joseph Hubbard, Second Vice-President, Boston; Benjamin W. Rowell, Treasurer, 28 School street, Boston; Ernest S. Weatherly, Assistant Treasurer, Sioux City, Ia.; Isaac Van Horn, Secretary and General Manager, 89 State street, Boston, Mass.; Ormond Rambo, General Counsel, 925 Chestnut street, Philadelphia, Pa.; James W. McIndoe, Chairman Executive Committee, 40 Oliver street, Boston, Mass.; Charles S. Rogers, Chief Engineer, Casper, Wyo. (but now in Boston). The Board of Directors consists of James L. Chapman, James W. McIndoe, Albert C. Smith, Benjamin W. Rowell, Joseph Hubbard, Isaac Van Horn, all of Boston, Mass.; Gurdon W. Hull, Wallingford, Conn.; Ormond Rambo, Philadelphia, Pa., and Charles A. Sherman, Alameda, Wyo.

RAILROAD CONSTRUCTION.
Incorporations, Surveys, Etc.

Baltimore & Drum Point.—The directors have decided to change the location of the road so that it will connect with the Annapolis, Washington & Baltimore at a point about a half mile from Millersville, instead of at Millersville. Owing to this change more grading will have to be done and the laying of rails will not begin for several weeks. It is hoped to lay the rails for the whole length of the line, 80 miles, during the present calendar year.

Buffalo & Susquehanna.—This road will be opened shortly. Mr. Foster Crowell made an examination of it this week for the bondholders preparatory to final arrangements for putting it in operation. The road is 60 miles long from Keating Summit on the Western New York & Pennsylvania Railroad northeast to Galetton on the Addison & Pennsylvania, including the Cross Fork branch. After it is in operation a branch will be built to a point on the Fall Brook Railroad, giving the new road three outlets. It is a standard gauge, high-class railroad, well built and well equipped. It was built for the purpose of opening up the timber property belonging to F. H. & C. W. Goodyear, of Austin, Pa., where is established the largest saw-mill in the world. Besides giving direct access to 200,000 acres of virgin hemlock forest it will afford a new outlet for Pennsylvania coal to western New York and Buffalo and develop a profitable local business, being the only railroad crossing Potter County.

Cape Breton.—The engineers who have been engaged in surveying the preliminary line from Hawkesbury to Louisburg for the Cape Breton Railroad Extension Company, have completed their work, and are now running a branch line from Sidney to Marion Bridge.

Chicago, Rock Island & Pacific.—When the company was building its Texas extension into Fort Worth it was prevented from completing the line as located through the city of Fort Worth to the Union station because of the exorbitant demands by the property owners for the right of way. The citizens of Fort Worth raised a large subsidy by subscription to pay for the right of way. Then by injunctions and other litigation compelled the company to again abandon the building of the line through the city limits as surveyed by its engineers. Recently these matters have been settled, and the contract has been let to J. P. Hughes, of Fort Worth, to complete the line to the junction with the Houston & Texas Central road.

Chicago, Sioux City & Bismarck.—Articles of incorporation have been filed with the Secretary of State at Springfield, Ill. It is proposed to construct a railroad from Chicago to Sioux City, thence through South Dakota, via the Blue Blanket Valley, to Bismarck, N. D. The principal office is in Chicago, the capital stock is \$1,000,000, and the incorporators and first Board of Directors are Ira N. Brown, of Wheaton, Ill.; R. H. Beattie, B. F. Bell and D. H. Lee, all of Chicago.

Edinboro & Erie.—This company, referred to last week as the Edinboro & Erie, has been chartered to build a line from Erie, Pa., southward, 16½ miles, to Edinboro. The capital stock is stated in the charter as \$200,000. The names of the officers are given in another column.

Mobile & Dauphin Island.—The Chief Engineer of this company has received instructions to resume the construction of the road and work was begun this week. The line is to extend from Mobile southward 36 miles to a deep water harbor on the Gulf of Mexico. The line lies on the west shore of Mobile Bay as far as Cedar Point; it crosses Grant's Pass and thence to the south shore of Dauphin Island. The project was started in 1887 and considerable work was done then, but it has lain dormant for several years. The Secretary of War has approved the plans for the bridge over Grant's Pass.

It is intended to have a harbor at Dauphin Island, with water 30 ft. deep.

Monterey & Fresno.—Col. A. W. Jones is now engaged on the final survey of this road between Salinas, Cal., and Hollister. The road is projected to extend from Monterey, on the coast, eastward, about 100 miles, to Fresno. Plans are being prepared for the wharf at the terminus and for the bridge across the Salinas River.

Montana Midland.—The Helena (Mont.) Independent reports that work is in progress on the line of this road from Helena eastward and from White Sulphur Springs westward. It is expected that the grading on the western part of the line will be finished by Nov. 1. The contractors intend to continue work through the winter. This line was projected to run from Niehart southward to the vicinity of White Sulphur Springs, and thence westward to Helena.

New Roads.—A committee has been appointed by prominent planters and others in Avoyelles Parish, Louisiana, to try to secure the construction of a railroad through the towns of Evergreen, Cottonport, Moreauville and Bordelonville. The last named place is 25 miles northeast of Bankie, on the Texas & Pacific, 162 miles from New Orleans. The committee will canvass the line to secure grants of right of way and will also consult with the officers of the Texas & Pacific and Southern Pacific railroads. The chairman of the committee is V. F. Gremithon. The meeting was held at Long Bridge Post Office and the chairman of it was L. L. Bordelon.

Notice is given that application will be made at the next session of the legislature of British Columbia for an act to incorporate a company to build a railroad from some point on the Gulf of Georgia, in Delta Municipality, to New Westminster, with a branch from some point in Delta eastward through Surrey, Langley and Matsqui, to Abbotsford.

Notice has been given that application will be made to the Canadian Parliament for an act to incorporate a company to build a road from Regina, N. W. T., southerly or southwesterly to a point on the international boundary line, near Wood Mountains; also a line from Regina northeasterly to some point on Saskatchewan River, east of the second Meridian.

Citizens of Sandersville, Ga., have applied for a charter to build an independent railroad and to connect that place with Tennesse on the Central of Georgia, three miles. A preliminary survey has already been made.

A local company has made a proposition to the Town Council, of Dartmouth, N. S., to build a branch railroad from that place to Windsor Junction. Mr. Ross, C. E., is representing the company.

Ohio Land & Railway Co.—This is the name of a company which has been incorporated in Ohio, with \$2,000,000 capital, and the object of which seems to be to promote the coal traffic of the Columbus Hocking Valley & Toledo Railroad by building branches, acquiring coal lands, etc. It is stated that 10,000 acres of coal lands have already been bought, and leaseholds secured on 10,000 more, all in the Hocking Valley. The incorporators were C. O. Hunter (General Solicitor for the C., H. & T.), C. H. Boardman, Thomas Johnson, James O. Somers, E. A. Cole, F. A. Prendergast and G. D. Preston, of Columbus, and the officers are: C. O. Hunter, President; E. A. Cole, Secretary and Treasurer. Agents have been at work for two years buying up land for the company. The general offices of the Ohio Land & Railway Company will be at Columbus. The incorporation papers give it the right to hold by purchase or lease mineral lands, to mine and transport coal, manufacture ores or other minerals, construct, lease and operate railroads, own or lease freight cars or other railroad equipment and hold stocks and bonds in railroads, transportation, coal and mining companies.

Ohio & Mississippi.—The Bedford Branch of this road was opened for business on Sept. 19. This branch is 12 miles long. It leaves the main line at Riverville, Ind., 121 miles west of Cincinnati, and extends northward to Bedford, where are extensive stone quarries.

San Diego & Phoenix.—The work on this road has been stopped. This is said to be in consequence of the stringency in the money market, but it is also reported that local enthusiasm is not so universal as it had been expected to be. The company proposed to build from San Diego, Cal., to Yuma, Ariz., and thence through Arizona by way of the Salt River and the Gila Valley to Phoenix, a total length of about 300 miles. Work was begun last spring and a few miles of track has been laid.

Saskatchewan.—Application will be made at the next session of the Canadian Parliament for a renewal of the charter of the Saskatchewan Railway & Mining Co.

South Mountain.—It is said that the Delaware River Railroad Co. is behind the scheme to re-construct this long abandoned line. Agents of the company are now negotiating with P. P. Bradley, of Harrisburg, for the purchase of his farm and mill property in Dauphin County, four miles from Harrisburg, Pa., with a view to locating a watering, freight and passenger station at that point. Several hundred men have for some time been at work on the line at various places and contractors March & Clark state that it will be completed before the year ends, though last week it was reported that the men had stopped work and that a large number of them had sued for their over due wages. The South Mountain was chartered in 1834 to connect Harrisburg with Slatington, Pa., and a good deal of grading was done soon after. The right of way and franchises have been the subject of a number of sheriff's sales.

St. Louis, Cape Girardeau & Ft. Smith.—The engineers of this company are surveying a line northward from Cape Girardeau in the direction of St. Louis. They will probably lay out a line to Irondele on the St. Louis, Iron Mountain & Southern, which is about 75 miles northwest of Cape Girardeau. The line lies through Perry, St. Genevieve and St. Francois counties. In this region the Iron Mountain road lies about 35 miles from the Mississippi River and the proposed new line would provide an outlet for the territory between the railroad and the river.

Wyoming & Utah.—A Salt Lake City paper reports that considerable work has been done on this road in the region of Coalville, Utah, and that the contractors hope to connect the mines at that place with the Wyoming Central Railroad within a few months. The General Manager of the road, however, in reply to our inquiries, has made no mention of any grading contracts lately. He says that the engineers making the locating survey are now in the field at several points, and will probably complete their work about Feb. 1. This road is projected to connect the western end of the Chicago &

Northwestern system at Casper, Wyo., with the Southern Pacific at Ogden, Utah. The distance between these points is about 400 miles. It is claimed that this road can be built with maximum grades of not over 42 ft. to the mile for almost the whole distance.

GENERAL RAILROAD NEWS.

Black Hills & Fort Pierre Railroad.—A dispatch from Lead, S. D., states that three bridges on this road have been destroyed by forest fires. It is said that the aggregate value of the bridges destroyed is \$55,000.

Connecticut River.—At the annual meeting held in Springfield, Mass., last week, it was voted to issue bonds not exceeding \$1,000,000 to pay off the indebtedness of the road, the bonds to run not more than 50 years and draw interest at four per cent.

Cleveland & Southwestern.—The Lake Shore & Michigan Southern has entered suit at Cleveland, O., asking for an injunction to prevent the consolidation of this road with the Cleveland, Lorain & Wheeling. The chief stockholders of the last named company organized the Cleveland & Southwestern for the purpose of connecting their road with Cleveland, and it is said that a contract for the construction of the new line has already been given out. The construction of this line would deprive the Lake Shore of a large share of the traffic which it now interchanges with the Cleveland, Lorain & Wheeling, which is considerable. In the complaint entered, it is stated that the price which it has been agreed to pay the contractors for building the proposed road, \$1,700,000, is twice too large. A meeting was to have been held this week to consummate the agreement between the two companies. The Lake Shore owns stock of the Cleveland, Lorain & Wheeling to the amount of about \$943,500 par value.

Jacksonville, Mayport & Pablo Railway & Navigation Co.—An order has been issued by Judge Call of the Circuit Court of Duval County, Fla., discharging the Receiver, Charles S. Adams, who was appointed on Sept. 8. The contentions of the rival interests have been amicably settled.

Jacksonville Southeastern Line.—On the application of bondholders and other creditors the United States Circuit Court at Springfield, Ill., has appointed C. H. Bosworth and E. Ellery Anderson Receivers. The corporate name of this company is the Chicago, Peoria & St. Louis. There were several suits and the court ordered them consolidated. The line of road owned by this company, including the Springfield branch, is 167 miles long, and it controls 231 miles more.

Lancaster & Hamden.—On application of James H. Keiner, contractor for building the road, the United States Court has appointed George W. Short, of New York, Receiver. This road was begun some six years ago, and a good deal of work has been done upon it; about 40 miles from Lancaster, O., to Hamden has been graded and six miles of track has been laid. According to Poor's Manual some 14 miles of track had been laid three years ago, but we do not find that the road has ever been operated.

New York, Lake Erie & Western.—The company makes the following report to the New York State Railroad Commission of operations during the year ending June 30, including the New York, Pennsylvania & Ohio: Gross earnings, \$30,638,078; operating expenses, \$20,271,695; net earnings, \$10,366,383; less proportions due leased lines, \$2,677,073; other income, \$1,003,589; gross income, \$8,782,916; fixed charges, \$8,015,440; net income, \$767,475; cash on hand, \$318,946; profit and loss (surplus), \$10,324,447.

Judge Lacombe, of the United States Circuit Court at New York, has sustained the Receivers in refusing to pay rental to the New York, Pennsylvania & Ohio for the time previous to their appointment. The Receivers have already paid \$339,439, which is more than the net earnings of the leased line since they took charge. The Erie lost in the operation of the "Nypano" \$425,888 for the fiscal year ending Sept. 30, and for the first ten months of the present fiscal year \$275,681. In his opinion the Judge says that the Receivers did not, by taking possession under the order of the Court, become assignees, committed to an obligation in any event to pay the full sum stipulated as rental by the lease.

Northern Pacific.—A committee of the Board of Directors has issued a circular asking for proxies for the annual election to be held on Oct. 19. The committee consists of Charles B. Wright, William L. Bull and Charles T. Barney. It has nominated for directors Johnston Livingston, Charles B. Wright, Charlemagne Tower, Jr., D. H. Houghtaling, R. C. Martin, Charles T. Barney, Thomas F. Oakes, William L. Bull, James B. Williams, J. B. Haggin and William R. Merriam, ex-Governor of Minnesota. Of these men Messrs. Wright, Barney, Oakes, Bull, Williams, Haggin and Merriam are members of the present board. The committee, in presenting these names, say: "As the board must consist of 13 directors, it will be necessary to designate two others to complete the ticket," and it is generally believed that the committee will endeavor to conciliate the opposition which is represented by the committee appointed a week ago. The Directors have amended the by-laws so that at the coming election Directors shall be chosen for one year instead of for three years as heretofore.

The Receivers state that since the issue of certificates was authorized the company's floating indebtedness has been reduced \$1,200,000 through payment to Kuhn, Loeb & Co. of collateral trust subscriptions and \$550,000 through the sale of securities held by creditors.

The United States Court at Milwaukee has authorized the Receivers to surrender the lease of the Wisconsin Central, as noted in another paragraph. The lease of the Wisconsin Central and its controlled lines to the Northern Pacific was made to run for 99 years from April 1, 1890, the rental to be 35 per cent. of the gross earnings on most of the lines and 37½ per cent. on certain other lines, with provision for certain modifications in case of large increases in the profits.

Old Colony.—The annual meeting was held in Boston on Sept. 26, and it was voted unanimously to authorize the directors to issue \$3,000,000 fifty-year bonds, interest payable semi-annually, not to exceed six per cent. President Choate announced that since the completion of the annual report it had been discovered that Treasurer John W. Washburn had made unauthorized use of the company's money, substituting stocks and bonds instead, from which it appeared there had been a defalcation. The securities are not worth the sums which they appeared for in the statement of cash on hand. It appears from subsequent investigations that the Treasurer confessed to his wrong doing and that his property has been assigned to the corporation. Mr. Washburn

is 75 years old and in poor health. He has been treasurer of the road for 30 years.

Philadelphia & Reading.—Alfred Sully, of New York, and John Lornie, of Scotland, have filed a bill in equity in the United States Court at Philadelphia, asking leave to intervene as plaintiffs in the equity suit brought by Thomas C. Platt against the railroad and coal and iron companies, this being the suit in which the Receivers were appointed for the corporation. The Court is asked to order that the Receivers be restrained from making any payments on account of illegal purchases of coal and of any rentals of leased lines in excess of the earnings thereof, and on account of equipment rentals and interest on floating debts; and that an order be made upon the Receivers requiring them to institute legal proceedings for trust funds illegally diverted. The petitioners say that Mr. Platt did not file the bill in good faith on his own behalf, but at the request of the managers, and that the suit is not being pressed with due diligence. The bill was referred to the Master.

Sedalia, Warsaw & Southwestern.—A petition has been filed in the Circuit Court by Charles S. Treadwell, of St. Louis, and other stockholders, asking for a receiver for this company. The road is a narrow gauge line from Sedalia south about 43 miles to Warsaw, Mo., and is operated by the Missouri Pacific. The object in asking for a receiver is to take the road out of the control of the Missouri Pacific, change it to a standard gauge and make it a part of the proposed north and south road from Sedalia to Springfield. The petition will be argued at the October term of the court.

Stillwater (Minn.) Union Depot.—The Massachusetts Loan and Trust Company has entered suit in the United States Circuit Court at St. Paul asking for the appointment of a Receiver for this company.

St. Lawrence & Adirondack.—A special meeting of the shareholders will be held at Valleyfield, Ont., Oct. 30, to consider a proposition to convey the road to the Central Vermont on such terms as shall then be agreed upon. The road is a part of the Central Vermont system.

Texas, Sabine Valley & Northwestern.—This road has been placed in the hands of a receiver, an order to that effect having been issued by Judge McCord at Athens, Tex., on Sept. 20. The road is about 40 miles long, from Longview Junction, Tex., to Boren. It has not paid expenses for some time and the pay rolls are two or three months behind time. The court appointed E. S. Terry, Master in Chancery, and Leon Harte, Receiver.

Toledo, Walhonding Valley & Ohio.—The Attorney-General of Ohio has begun proceedings in the Supreme Court to oust the road from occupancy of the canal bank in Coshocton County. The State claims the road is occupying the canal bank without authority.

Wheeling Bridge & Terminal Co.—In the United States Court at Wheeling, W. Va., Sept. 20, Judge Jackson appointed C. O. Brewster, President of the Wheeling Bridge & Terminal Railway Company, Receiver of the company. The application was made by W. C. Percy, solicitor for the Washington Trust Company, of New York, trustee under the first mortgage of \$2,000,000. The application was made by request of a large majority of bondholders. The company has no indebtedness other than its overdue coupons. The petition states that the property of the company is not now, and never has paid more than expenses of operation, if that, and there is no reasonable prospect that a change from this state of affairs is likely to come in the near future. Mr. Brewster has been acting as general manager and superintendent of the property for some months, and will continue in that capacity. On Friday, similar action was taken in Columbus, O., with regard to that portion of the property which is located in the State of Ohio. It is stated that the building of the Benwood extension of the road will be continued to completion by the Receiver.

Wisconsin Central.—A decision canceling the lease of the Wisconsin Central to the Northern Pacific was rendered at Milwaukee on Monday last by Judge Jenkins and Judge Seaman, of the United States Court. Judge Jenkins reviewed the facts presented in the arguments for and against the intervening petitions of the Wisconsin Central and Chicago & Northern Pacific, and said it was not a question of endeavoring to carry out financial schemes which the condition of the Northern Pacific Company rendered impossible, or of conserving the assets in the interest of the creditors, secured and unsecured, but that if the Chicago & Northern Pacific had a claim it was simply as a contract, and that its interests were not to be considered paramount to those of other creditors. The accounts submitted, he said, showed that since the lease went into effect the Chicago & Northern Pacific had been operated at a loss to the Northern Pacific of \$1,304,169 and the Wisconsin Central at a loss of \$1,142,316. This order covers the Chicago & Northern Pacific also, which owns the terminals in Chicago. These were leased to the Wisconsin Central, and by that company re-leased to the Northern Pacific.

TRAFFIC.

Traffic Notes.

A well known ticket broker of Houston, Tex., has been arrested under the new anti-scalper law of that state.

Coke shipments are looking up, aggregating 37,800 tons from the Connellsville district for the week ending Sept. 16. Over 300 new ovens have been fired.

Representative Rayner, of Maryland, has introduced in Congress a bill to authorize the issue of interchangeable 5,000-mile tickets, with special baggage privileges for traveling salesmen.

Western papers report that the mining industry in Utah and Idaho is beginning to recover from the depression started by the fall in the price of silver last June. The output of ore is slowly increasing.

The fast mail train over the Richmond & Danville now runs through between New York and New Orleans in about 31 hours. New York mails reach New Orleans about 12 hours earlier than heretofore.

The rate on corn from Chicago to Buffalo by lake last week was as low as 1½ cents a bushel, and in some cases went down to 1¢ cents. Wheat is being taken from Duluth to Buffalo at 2 cents a bushel, and coal from Buffalo to Duluth at 20 cents a ton.

The Delaware, Lackawanna & Western has built at Hoboken, N. J., a freight house, with slatted sides, to be used exclusively for live poultry. The building is 50

x 300 ft. Large quantities of poultry come to New York over this road from the Western states. Eight cars were unloaded in one day recently.

A St. Paul paper reports that the railroad companies bringing coal from Lake Superior ports to that city have discontinued the discount heretofore allowed to employees on coal for their own use, this action being taken because a large retail coal company threatened to boycott one of the roads in consequence of this favor to the employees.

The answer to the complaint lodged with the Board of Railroad and Warehouse Commissioners of Minnesota alleging that the charge, by the St. Paul & Duluth, for hauling hard coal from Duluth to St. Paul and Minneapolis is excessive, was filed on the 22d inst. The railroad company claims that the rate charged, \$1.50 per ton, is a reasonable one; that any substantial reduction in the rate would so affect the income of the road that it would amount to confiscation of the railroad, and would deprive the defendant company of its property without due process of law.

Chicago Traffic Matters.

CHICAGO, Ill., Sept. 27, 1893.

The Southern Pacific has agreed with the Atchison, Topeka & Santa Fe to withdraw all reduced passenger rates from California eastbound and to restore rates on Oct. 2. This decision is commendable, as nothing but loss of revenue to all roads concerned could result from the reductions. The Santa Fe is amply protected under the terms of its contract with the Southern Pacific, and having a route over its own rails from Southern California is in a better position than the latter to continue a rate war.

The Southwestern Traffic Association failed last week to elect a chairman. It is reported that the vote was a tie between Oscar G. Murray and Henry C. Wicker. Affairs took such a turn, however, that neither could be elected, as a unanimous vote is necessary, and an adjournment was taken until next week. In the meantime the Missouri, Kansas & Texas has agreed to suspend its notice of withdrawal. It is said that the present managers of the latter road are in favor of the re-election of ex-Chairman J. N. Faithorn, but it is doubtful if he would accept.

The Receiver of the Jacksonville Southeastern, C. H. Bosworth, of Springfield, is quoted as desirous of renewing friendly relations with connections of that line, and of again becoming a member of the Western Passenger Association. For some time this association has declined to accept the tickets of the Jacksonville Southeastern on account of its persistence in reducing agreed rates.

The Freight Committee of the Central Traffic Association has decided that only one change in consignee or destination is permissible on through consignments of grain from competing points in association territory delivered to Southern lines, and this only when made in accordance with the specified association rules.

The Northwestern lines will make "hunters'" rates until Nov. 15, to points in Wisconsin and northern Michigan, good returning until Nov. 30, at 80 per cent. of the double locals.

The Southwestern Traffic Association has replied to the action recently taken by the Central Traffic Association in canceling tariffs to points in Texas and Mexico, by taking similar action and by requesting Commissioner Blanchard to furnish a list of the roads joining in the action. This Commissioner Blanchard declines to do, and the Southern lines are now endeavoring to find connections to join them in through rates. It is probable that, as heretofore, they will be successful in this, notwithstanding the present determination of all the roads to decline.

Chairman Caldwell of the Western Passenger Association rules that individual lines, members of the Association, must not use rates tendered by connections without first submitting them to action by the Association.

Trans-continental lines are now considering rates for the California Midwinter Exposition. The Central Traffic lines will apply the rules governing return of exhibits from district and state fairs.

The shipments of eastbound freight, not including live stock, from Chicago, by all the lines for the week ending Sept. 23 amounted to 48,306 tons, against 52,493 tons during the preceding week, a decrease of 4,187 tons, and against 63,001 tons for the corresponding week last year. The proportions carried by each road were:

Roads.	W'k to Sept. 23.		W'k to Sept. 16.	
	Tons.	P. c.	Tons.	P. c.
Michigan Central.....	5,652	11.7	6,043	11.5
Wabash.....	3,516	7.3	3,921	7.5
Lake Shore & Michigan South.	7,976	16.5	9,265	17.6
Pitts., Ft. Wayne & Chicago.	4,693	9.7	5,059	9.6
Pitts., Cin., Chicago & St. Louis	7,189	14.9	6,874	13.1
Baltimore & Ohio.....	3,231	6.7	3,324	6.3
Chicago & Grand Trunk.....	3,548	7.3	3,512	6.7
New York, Chic. & St. Louis..	5,376	11.	6,409	12.2
Chicago & Erie.....	5,070	10.5	6,323	12.1
C., C. & St. Louis.....	2,134	4.4	1,763	3.4
Totals.....	48,306	100.0	52,493	100.0

Of the above shipments 1,156 tons were flour, 14,687 tons grain and millstuff, 10,864 tons cured meats, 12,566 tons dressed beef, 1,366 tons butter, 1,241 tons hides and 3,104 tons lumber. The three Vanderbilt lines carried 39.2 per cent., the two Pennsylvania lines 24.6 per cent. The Lake lines carried 112,839 tons, against 123,891 tons during the preceding week, a decrease of 1,052 tons.

(Other Chicago traffic news will be found on page 718.)

To Amend the Inter-State Commerce Law.

Representative Patterson, of Tennessee, has introduced in Congress a bill to amend the Inter-State commerce law. The measure is similar to the one prepared by the House Committee on Inter-State and Foreign Commerce of the last Congress and passed by the House.

The first section of the bill is intended to obviate the construction which the courts have placed on the words "the same line," as they appear in the present law. The courts have held that where several railroads connect, constituting one line for the transaction of business, any less number forming in part the same line, may charge, without violating the law, a greater rate than is charged over the same line. Section 2 provides that railroad companies may make "contracts, agreements or arrangements" for apportioning among themselves their traffic or their gross or net earnings on the conditions prescribed, and it is expressly provided that the same shall remain lawful only so long as the approval of the commission shall continue. When the commission withdraws its approval the contract, in express terms, ceases to exist, and no appeal lies.